

# MOTOR AGE

Vol. XXIX  
No. 10

CHICAGO, MARCH 9, 1916

Ten cents a copy  
Three dollars a year

This Year We Are  
Making  
Twice  
as Many

1916  
Fourteen Million

Champion  
TOLEDO MADE FOR THE WHOLE WORLD'S TRADE  
Dependable Spark Plugs

1915  
Seven Million

## What Our Big Production Means to You

Year after year for many years, we have made more spark plugs than all the others *combined*.

Year after year we have greatly enlarged our output. This year we will double last year's production.

Year after year we have made Champions more and more dependable.

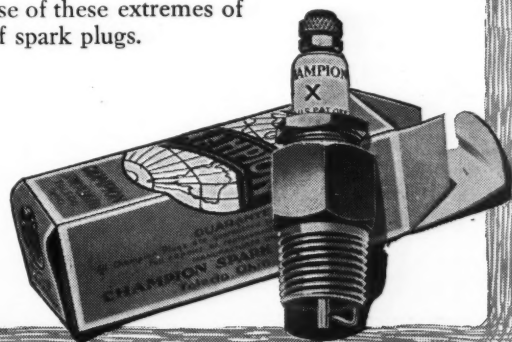
As our production has grown we have been able to adopt extreme and still more extreme measures to insure dependability—

Because—as our production increases we can distribute the expense of these extremes of engineering, of testing and of processing over a vastly larger number of spark plugs.

That's why Champions are so much more dependable.

The motoring public knows these facts. Experienced owners demand Champions. The wise dealer is the one who takes advantage of this demand and stocks up exclusively with Champions. See your jobber or write to us today.

CHAMPION SPARK PLUG COMPANY  
1105 Avondale Ave. Toledo, Ohio



# 34 H. P. Added

*Without Adding Size  
or Cylinders in the*



**\$1375**  
at Detroit

Patented by Hudson  
December 28, 1915  
Patent No. 1165861

## Hudson Super-Six

### Wasted Power Now Reserve Power

**T**HE Super-Six motor has identical size with the former Hudson Light Six.

But the former type, at its best, delivered about 42 horsepower. The Super-Six delivers 76 h. p.

No more power is created, no more fuel is consumed. All that added power—that extra 80 per cent—is power that was lost in friction. And that friction was due to vibration.

#### THE IDEA IS NEW

The Super-Six motor follows standard practice in all respects save one. But that one new feature, by eliminating vibration, gives us 70 per cent more efficiency.

The idea is new—a basic invention—as proved by the fact of our patent. It is also proved by performance. The Super-Six has broken all the stock car records.

It has outrivaled every former type—Sixes, Eights and Twelves.

And this new motor is a Hudson invention, controlled by Hudson patents. So it gives to the Hudson unquestioned supremacy.

#### Reason for 76 H. P.

In the light-weight Hudson this 76 horsepower means a vast reserve power.

It means effortless performance on any road or

hill. It means quick acceleration, matchless flexibility.

It means economy, for the motor rarely runs at more than half its capacity.

It is not added power, remember. It is power that we save by saving vibration—power that was heretofore wasted.

#### LITTLE ENGINE WEAR

All this extra power—this 80 per cent—means that much lessened friction. Engine wear has been almost eliminated.

In our speedway tests a Super-Six stock motor was run for 1350 miles at speed exceeding 70 miles per hour. It was the hardest test a stock car ever stood. But not a part or bearing showed any discoverable wear.

The motor's endurance has been almost doubled by this Super-Six invention.

Take a ride in the Super-Six. Put it through its paces. Then you will realize that fine-car buyers are bound to demand this efficiency.

7-Passenger Phaeton,  
\$1375 at Detroit.

Five Other Styles  
of Bodies

HUDSON MOTOR  
CAR COMPANY  
Detroit, Michigan

#### All Other Cars Outrivaled

At Sheepshead Bay, under A. A. A. supervision, a 7-passenger Super-Six stock car excelled all former stock cars in these tests.

100 miles in 80 min., 21.4 sec., averaging 74.67 miles per hour, with driver and passenger.

75.69 miles in one hour with driver and passenger.

Standing start to 50 miles an hour in 16.2 sec.

During these tests the car was driven 1350 miles at top capacity, at speed exceeding 70 miles per hour, without discoverable wear on any part.





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### —NEXT WEEK—

The feature of Motor Age for March 16 will be "When You Insure Your Car," and will give the innermost secrets of all classes of insurance, give reliable information on risks and offer the car owner an analysis of the various methods for insuring against losses of all kinds.

# 1916

## The Wonder Year of the Motor Car Industry.

The advertising opportunities it affords are unique and may not soon occur again.

Take advantage of the remarkably favorable condition of affairs to emblazon your product and your name on the minds of those whose verdicts count, not alone in the matter of their own purchases, but also in the far-reaching influence they have over the purchases of others.

In a month the motoring season opens. Millions of dollars are going to be spent for new equipment, accessories and supplies. Advertised products are going to have the call. It is not too late for you to get in your bid for a share of this vast business.

Let our advertising counsellors—veterans of a thousand motor car and accessory campaigns and specialists in automobile advertising—confer with you as to the best methods of taking strategical advantage of the splendid opportunities the present year affords.

## Motor Age

910 S. Michigan Avenue  
Chicago, Ill.



The New Home of  
MOTOR AGE  
and the Western Offices of  
THE CLASS JOURNAL CO.  
and its allied interests

THE AUTOMOBILE "MOTOR PRINT"  
MOTOR WORLD "COMMERCIAL VEHICLE"  
THE AUTOMOBILE BLUE BOOKS  
THE AUTOMOBILE TRADE DIRECTORY

Larger Quarters  
Central Location  
Increased Facilities  
Top (21st) Floor

MALLERS BUILDING—CHICAGO  
S.E. Corner Wabash Ave. and Madison St.

## Why I am a Studebaker Dealer

**B**ECAUSE my chief reason is that I believe it is the very best connection I could possibly have in the automobile business. During my experience of nearly 8 years handling this line, my relations with the Studebaker Corporation have been very pleasant, and highly profitable because I firmly believe that my investment in the automobile business as a Studebaker dealer is very secure, and safeguarded to a high degree by the policy of helpfulness, and backing of an organization as efficient, and financially able as the Studebaker Corporation.

*Frank A. Peck*

Peck & Arnold,  
Rochester, N. Y.



The astonishing manufacturing facilities that Studebaker possesses are one of the biggest reasons for Studebaker Dealers' confidence—and success. Write for the other reasons.

### STUDEBAKER

South Bend, Ind.

Detroit, Mich.

Walkerville, Ont.

*Address all correspondence to Detroit*



# MOTOR AGE



## Metamorphosis

By L.V. Spencer With Sketches

Progressive Assembly Systems  
Secret of Big Production—  
Study Building Closely

DID you ever see, on one of your excursions to the movies, a picture of the growth of a flower from its early budding to its final form? Or did you ever happen to see the various stages in the transformation of a chrysalis into a butterfly. It took many days for the camera to make those pictures for you because the gradual and almost imperceptible change were filmed as nature slowly brought about the development. For a long time the camera was trained on the plant of the chrysalis in making the multitude of pictures that recorded each slight step towards completion. And it was a most wonderful thing to watch a real plant grow rapidly on the screen as the pictures followed one another in rapid succession, blending the changes until it seemed a very quick process indeed.

Even this cleverness of the film has been outdone by some of the makers of motor cars in Detroit and other cities where enormous daily outputs have come to be regarded as a matter of course. If you watch the growth of this very elaborate piece of machinery from a mere frame to a throbbing, modern motor vehicle as

## of the Motor Car

and Diagrams by Tom Wilder

Chain Pulls Frame Along on  
Its Pilgrimage from Em-  
bryo to Adolescence



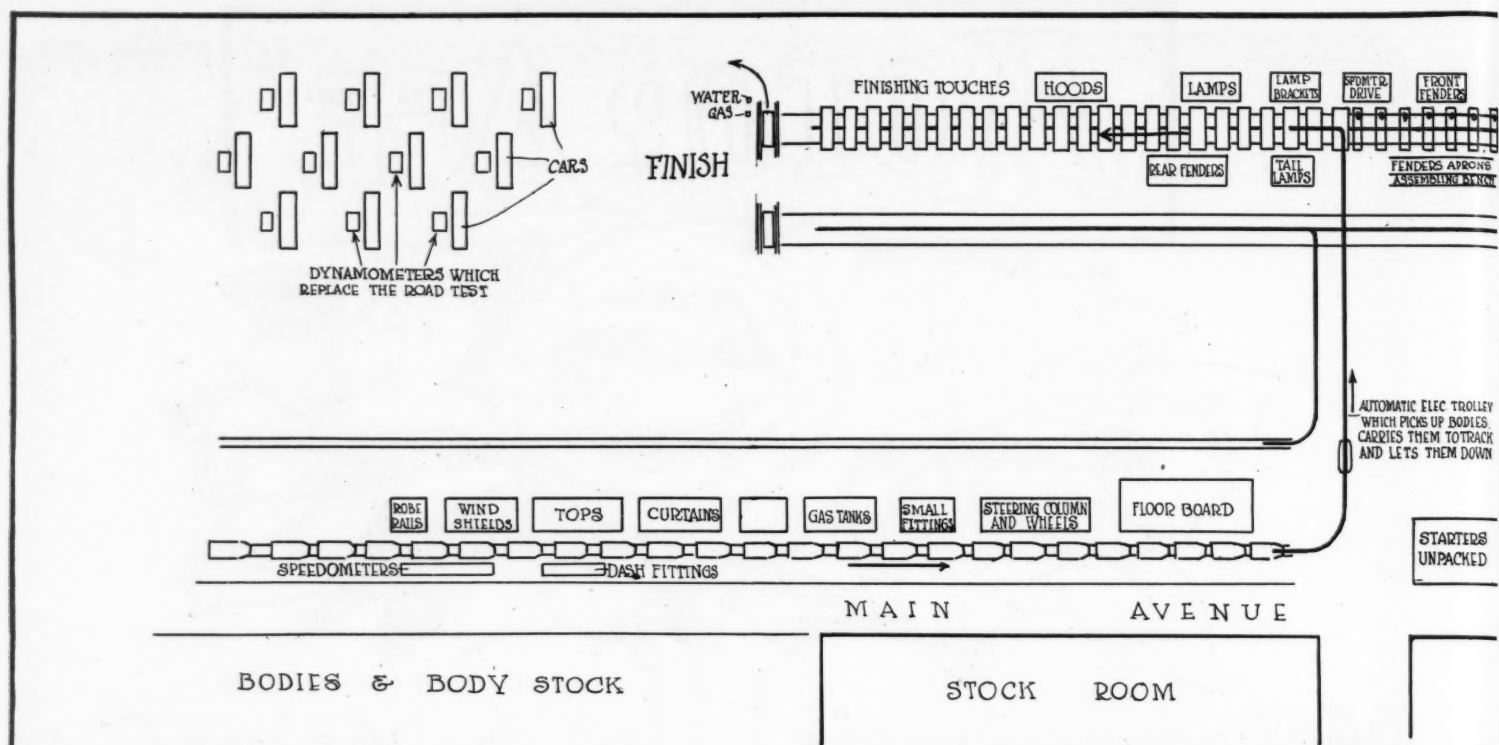
it moves from one end of a long building to the other, you feel that the movie camera is much more of a respecter of time than is the great relentless chain that pulls the chassis along a track while workmen swarm around it like bees, and add part after part in their race with the fleeting minutes. Starting on its journey as a thoroughly lifeless mass of steel, it comes off the conveyor 800 feet down the assembly track a thing of life and beauty. In less than 4 hours it

has grown from a hopeless nonentity into a motor car.

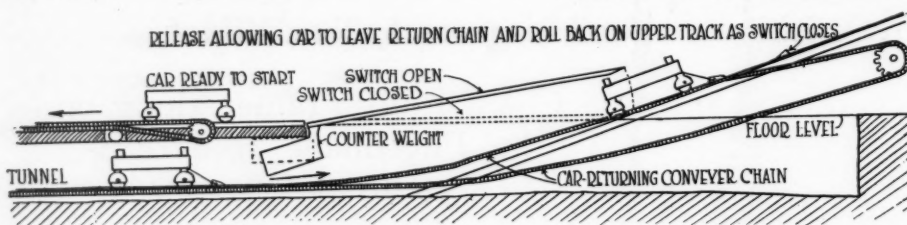
The secret is the moving progressive assembly system that has been installed, with a variety of modifications, in eight or ten of the largest car producing plants of the country. By its use the production department can say definitely how many cars it can build in a given time, for it knows how fast the conveyor chain moves, and how many chassis can be put on the track, and with this knowledge the completion of the cars is as irresistible as the flight of time itself. It knows that a new chassis will begin as soon as another has gone a step farther and that the finished cars will leave the track, just as



The great relentless chain is no respecter of time. Workmen swarm around the chassis like bees and add part after part in their race with the fleeting minutes



Maxwell has a very simplified form of assembly plant; it is double throughout, all on one floor and



How the small trucks are returned and started automatically

fast as the chain brings them to the stopping point.

Ford was perhaps the first to install the moving assembly scheme, and to set an example for the rest of the motor vehicle world. It was marveled at when it first became known that the Ford car did not stop in its process of manufacture until it was driven from the conveyor under its own power. Before long others saw the advantage of introducing the element of time relentlessly, and they set about to go the Ford plant one better. Today most of the big producers have installed the moving system with the modifications and improvements which the production departments of each deemed best suited for the kind or class of cars being built. Certain differences in shape and size of factory buildings dictated different applications of the principle, but they all are the same in their general workings. Painting of the chassis, baking of the various coats of color and varnish, assembly of the body to the frame and many other details that were not in the original plan have been introduced.

#### Growth of the Chassis

In nearly every application the chassis is carried along on a conveyor truck which runs on a track stretching the length of the building. Along the floor in the center of the track is a heavy chain that is powerful enough to pull all the chassis that are

in the different stages of completion. The conveyor truck has a hook which is slipped into a link of the heavy chain, and the growth of the chassis begins. Stationed

along the track are the various parts that must be assembled to the chassis, and each man has a special thing to do or a part or accessory to put on.

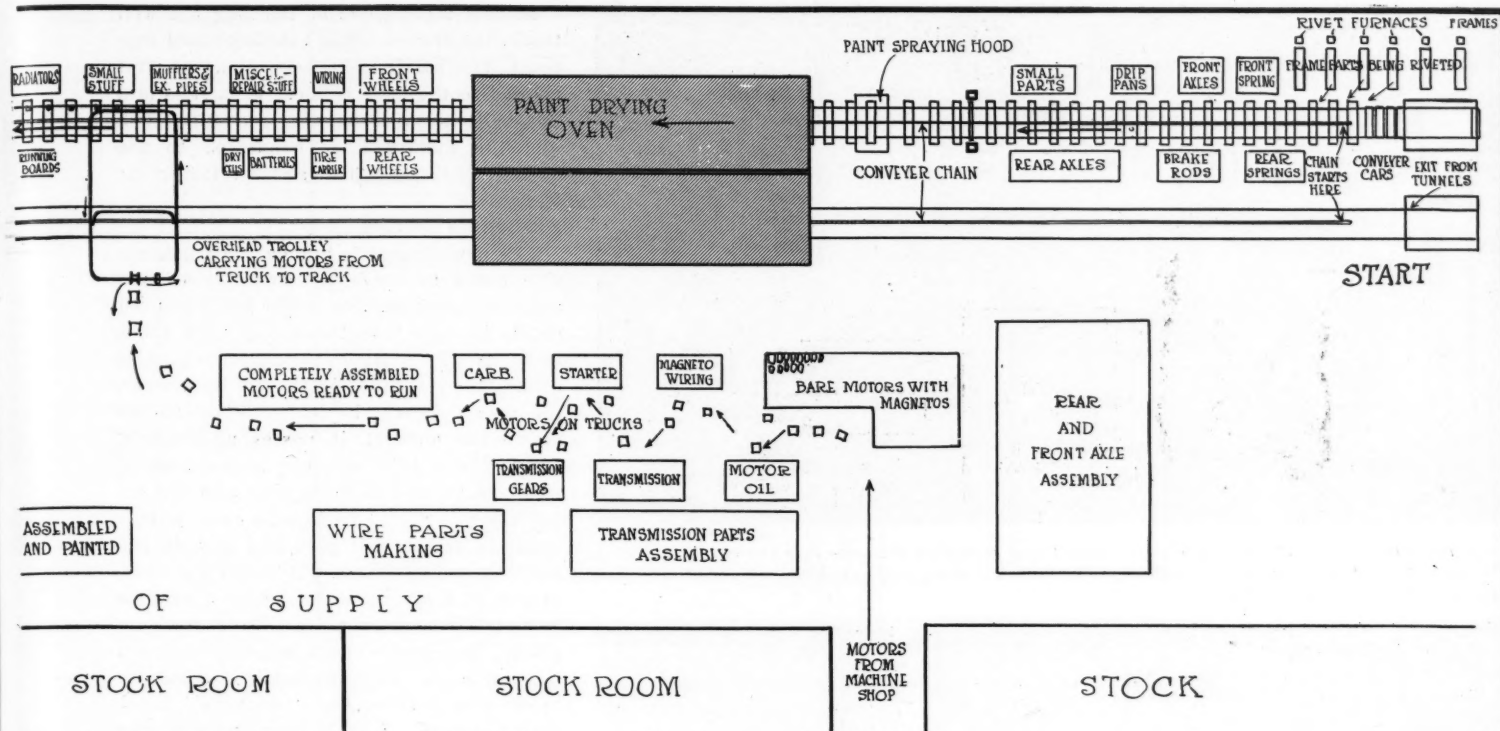
#### Monorail Handles Heavy Parts

The heavier units such as motors, axles, bodies, etc., must be put in place without stopping the procession. Pneumatic and electric hoists in conjunction with monorail carriers overhead assist the men who put on these important components, and as soon as one is installed they get another ready to drop in place the minute the next chassis reaches the right point. Arriving



The birth of a car. First step in the creation of another friend of John D. The frame, almost bare, is put on the conveyor truck upside down and from this point it does not stop until it is a thing of life with a throbbing motor and shiny body. Eight hundred feet farther down the long room and  $3\frac{1}{4}$  hours later it will leave the conveyor truck under its own power a finished car. Scene in Maxwell factory

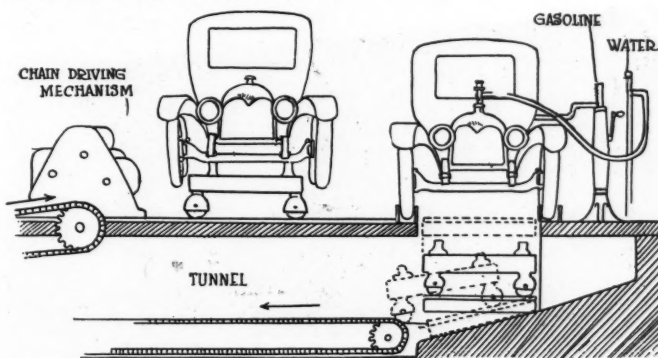




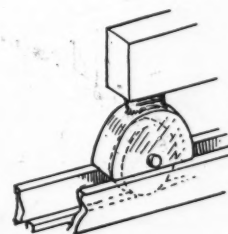
the tracks do not change direction from start to finish. The various processes are shown above

in finished condition at the end of the line, ingenious schemes of removing the cars from the trucks that have carried them from the start are employed. There is no uniformity about this, but some means of lowering the car on to its own wheels and at the same time shoving the truck from under it usually is employed in most of the factories.

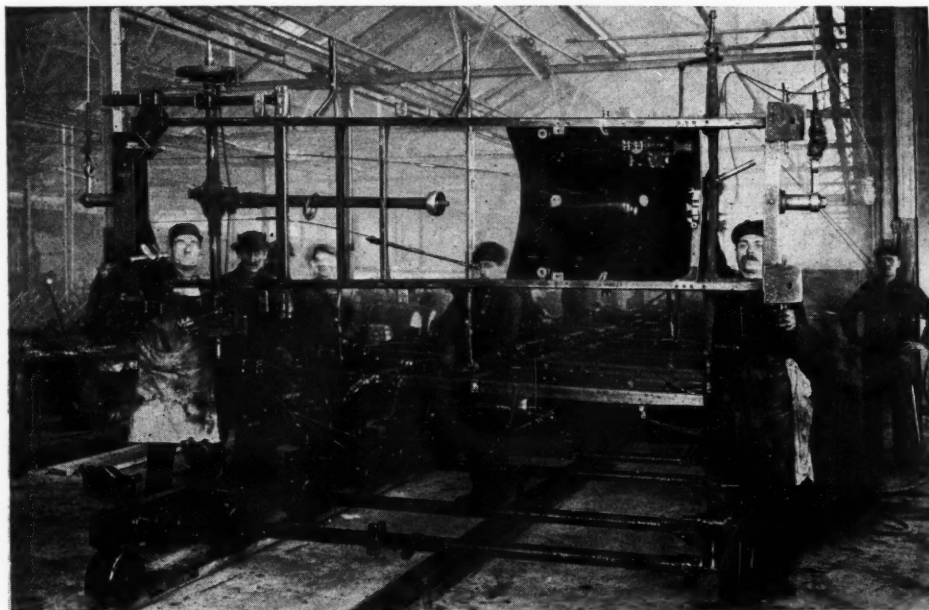
The Maxwell company at one of its Detroit plants has recently completed the installation of a moving assembly that is typical of the type in which the entire work is done on one floor and one track.



In the Maxwell unloading scheme, the truck with its completed car runs into a small elevator; when this drops, the car rests on a runway



A little precaution against pinched toes

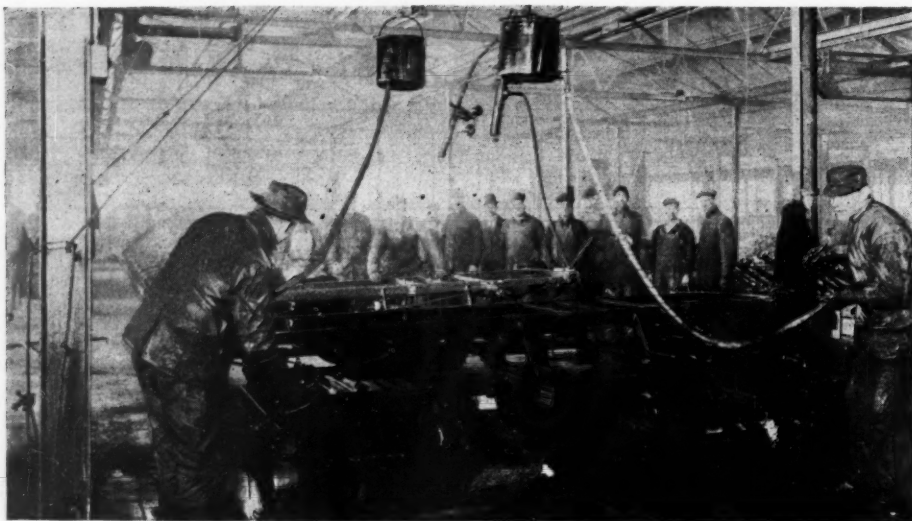


Up to this point, the moving truck has carried the car frame upside down to facilitate attachment of springs, axles, etc. But from here on the chassis must be right-side up. So lifting attachments are slipped on to each end of the frame and the whole thing is lifted by an overhead power hoist. Then the joints of the lifting attachments permit of the frame being turned over readily, after which it is lowered right-side up on to the ever-moving truck. Scene in Maxwell plant

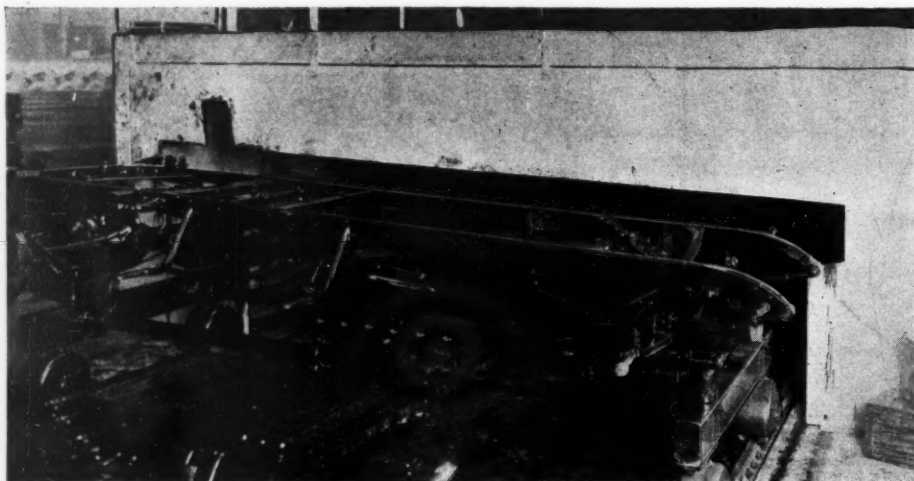
Others of the big factories in Detroit, such as Paige and Hudson, carry the moving assembly along on two floors, bringing the cars to a certain point and then transferring them to another floor for completion, and Packard has a very elaborate scheme of trackage and moving assembly that conveys the chassis into several different rooms in the course of its progress, but none of these does it all on one very long line. Overland is another big producer that utilizes the chain assembly on one level, while Studebaker, Dodge, Reo, and Saxon have adopted the scheme with modifications suitable to their factories and product.

#### 250 Maxwells Daily

At the present time Maxwell is building 250 cars in 9½ hours on its single moving track. Another is in the process of completion, when the output can be doubled if necessary. The conveyor is 800 feet long and there is room for 100 cars on it at any one time. From the moment the frame first begins to move at the starting end until the completed car is driven off under its own power, about 3 hours and 15 minutes are consumed. That includes painting



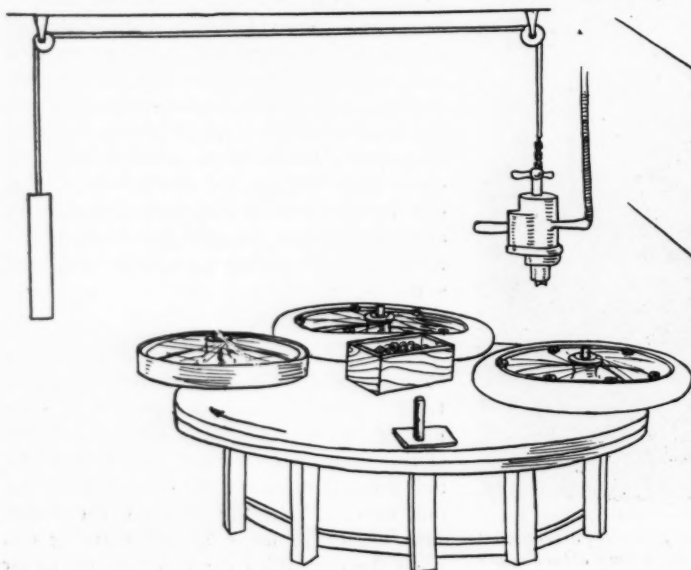
*Spraying the moving chassis with black enamel just before its entrance into the oven for drying. The enamel is contained in the tanks above. The heartless chain will not permit of a halt even here. Courtesy of Maxwell Motor Co.*



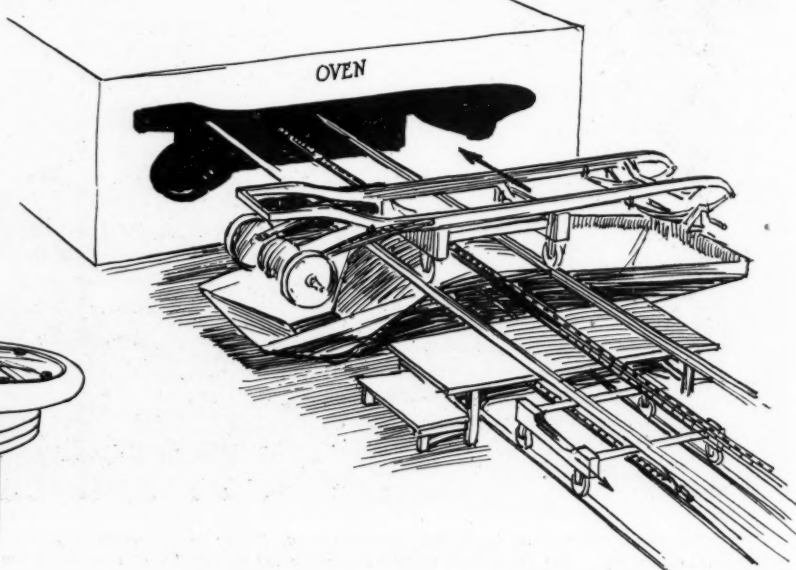
*Painted chassis just entering the drying oven. In 30 minutes the moving chain will pull it out dry at the other end, and work of adding to its bareness will continue again. Another follows it only a few feet away*

of the frame and a 30-minute trip through the baking oven which covers the track for a distance of 100 feet. The chain moves

the embryonic chassis 40 inches a minute, which is fast enough to keep the assembly crews going at a good pace.



*Revolving wheel and rim assembling table at the Paige plant. The table top revolves the wheels from one man to the next*



*Entrance to drying oven shaped to fit the outline of the chassis and retain the heat. This also shows the truck returning on the lower track*

At the starting end of the long Maxwell track, the fender irons, running-board supports, tire carrier brackets, etc., are first riveted to the bare frame. Then it is laid upside down on the waiting conveyor truck and the pulling hook connected to the chain. The creation of another motor car has begun.

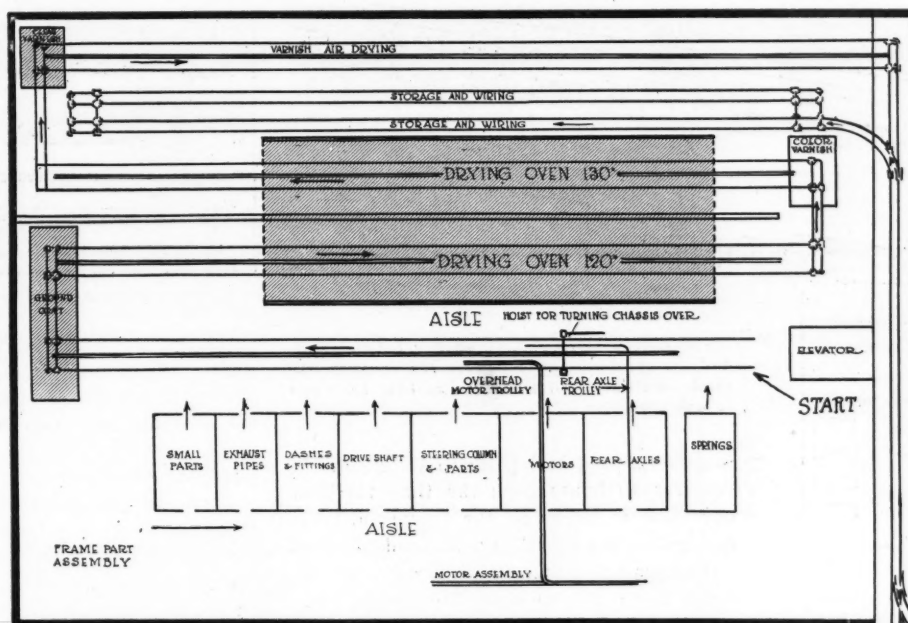
#### **Fitting the Springs**

The new chassis is put on the truck upside down to facilitate assembly of the axles and springs. No sooner has it started on its journey than the spring crew takes it in hand. A little farther along axles await it. Suspended in the air by a hoist, the rear unit will be let down on to the frame the moment it passes underneath. As the rear axle men are busily making connections, and as the spring men are doing their part, the front axle crew is hurrying to attach that part and pass to the next oncoming frame. It takes 1½ minutes to fit a spring, and not over 3 minutes to put in the rear axle. These parts in place, the chassis next must be turned right side up. It takes but half a minute to do this, for the two "flopers" know their business. Quickly they slip a lifting bracket on to each end of the frame, and then a power hoist lifts it free of the conveyor truck by steel cables. The brackets have joints that can be turned, and with the frame in the air it is easy for the men to turn it over, after which the hoist lets it down right side up on the truck before it has gone more than a few inches.

Here the paint crew takes it in charge, and with paint guns they spray the frame and running gear thoroughly as it moves over a pan to catch all the drips off. There is enough distance here to allow for a thorough coating, and then the chassis enters the oven. The opening in the end is shaped to just let the chassis and its truck pass through, for no more heat must be allowed to escape than absolutely necessary. When, half an hour later, the chassis emerges from the other end of the long oven, the paint has been thoroughly baked



The Packard Co. takes pride in the orderly arrangement of its stock rooms. These are so placed that material from them goes directly onto the passing chassis. There is no cluttering of the aisles with stock and no loose parts on the floor



The start is at right, near elevator shaft. The chassis travels the length of the assembly plant four times, including the trip through the long drying ovens. Then, passing into the main aisle, at extreme right, the car takes shape rapidly upon the naked chassis

on, and more assembly operations can begin. Very soon the point is reached where the motor is added, and before the chassis gets here the motor crew has seen to it that everything is in readiness.

Meanwhile other crews are working on such parts as steering gear, muffler, piping, etc. Down drops the motor when the chassis gets directly below it, and quickly the men bolt it in place. Others are busily fastening wires, putting on the radiator, and doing other things. Each man knows his particular work and he does it regardless of what else is going on at some other part of the moving car.

An advance body crew soon is busy laying felt strips on which the body will rest on the frame, and every operation that has to be done before the application of the body is finished in time for the body assemblers to take the chassis in hand. Brought over by an electric hoist from the body assembly track on the other side of the assembly floor, the body with top and all upholstery and wiring in place, and with the steering wheel in position, is lowered on to the chassis at just the right time. The instant it rests on the frame, the body men are busily engaged in fastening it and making connections between body parts and chassis.

#### Car Nears Completion

By this time the car is well along towards completion and looks much like a Maxwell. Its wheels, with tires already in place, are put on, and finally the car is complete. A measured quantity of gasoline and water are added, and then an interesting thing happens. The car is pulled on to a device for releasing it from its truck. Arriving at this point, the hook that has attached the truck to the chain automatically is released, and the truck rolls down a slight incline and rests in a position where the wheels of the car are directly over runways that are at right angles to the track. Then that portion of the track on to which the truck has passed is lowered until the car wheels rest on the runways, and the

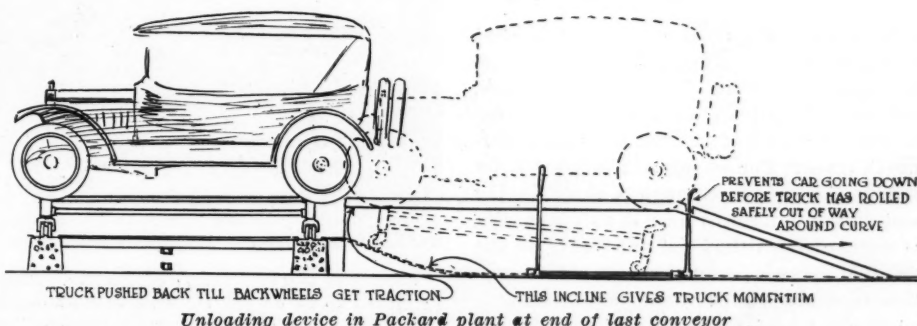
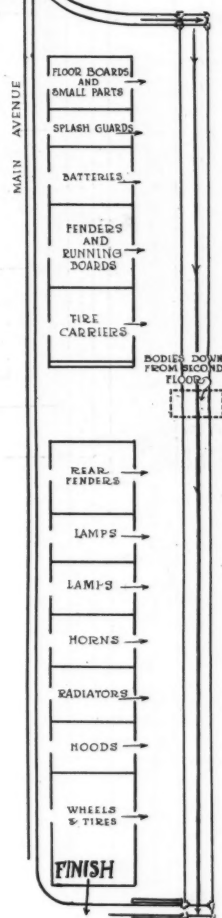
vehicle is driven off and on to the floor by its own power. The conveyor truck is lowered down on to another track that also is equipped with a chain, and runs in a tunnel directly under the assembly track. This lower chain automatically engages the truck's hooking device and pulls it back to the other end of the long assembly track so that it can again do duty in bringing another car through. Arriving at the other end, the trucks are pulled up hill and automatically switched on to the assembly track again ready for business.

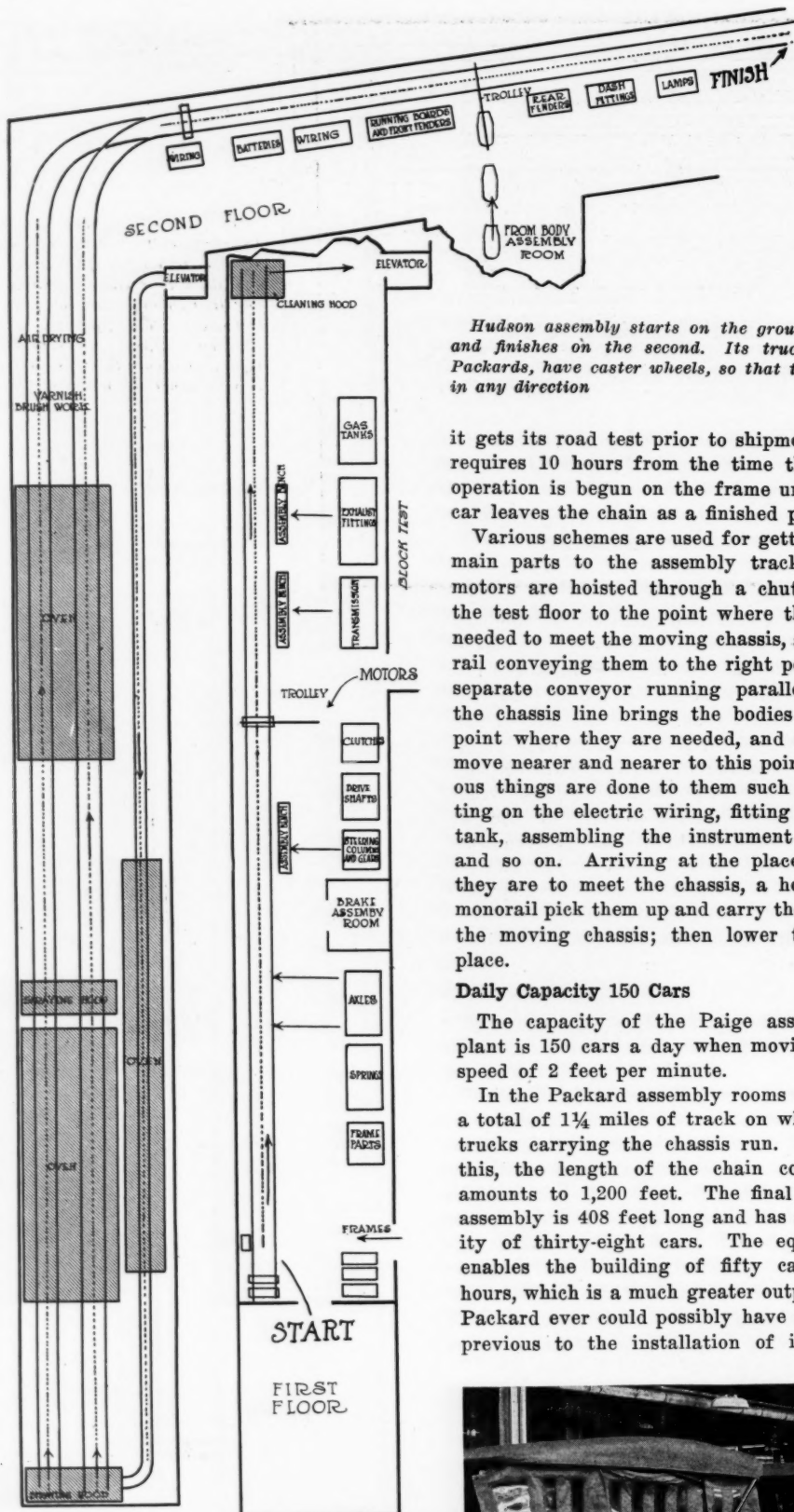
#### Paige Process Similar

The start is made much the same way at the Paige plant. On the third floor there is a 735-foot conveyor for the assembly of the frame and axle parts and the painting. Having added axles, etc., and turned the frame over, it gets first a priming coat in 2¼ minutes, then takes 1¾ hours to go through an oven 134 feet long that has a temperature of 180 degrees. After 36 minutes for cooling, it arrives at the next painting point, and the same size of oven next receives it for another 1¾ hours. Twenty minutes more of cooling is allowed after emerging from this, and then the final varnish coat is sprayed on and the last oven is entered.

Another 20 minutes of cooling finishes the painting part, after which the chassis is attached to a link of the chain.

Arriving at the far end of this conveyor, the car is driven off under its own power, and down an incline to the ground where





Hudson assembly starts on the ground floor and finishes on the second. Its trucks, like Packards, have caster wheels, so that they run in any direction

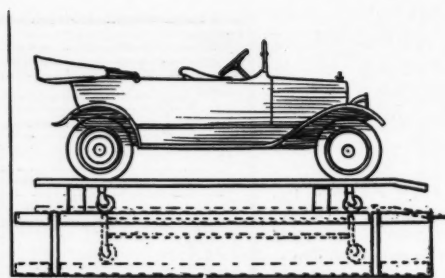
it gets its road test prior to shipment. It requires 10 hours from the time the first operation is begun on the frame until the car leaves the chain as a finished product.

Various schemes are used for getting the main parts to the assembly track. The motors are hoisted through a chute from the test floor to the point where they are needed to meet the moving chassis, a monorail conveying them to the right point. A separate conveyor running parallel with the chassis line brings the bodies to the point where they are needed, and as they move nearer and nearer to this point, various things are done to them such as putting on the electric wiring, fitting the gas tank, assembling the instrument board, and so on. Arriving at the place where they are to meet the chassis, a hoist and monorail pick them up and carry them over the moving chassis; then lower them in place.

#### Daily Capacity 150 Cars

The capacity of the Paige assembling plant is 150 cars a day when moving at a speed of 2 feet per minute.

In the Packard assembly rooms there is a total of  $1\frac{1}{4}$  miles of track on which the trucks carrying the chassis run. Besides this, the length of the chain conveyors amounts to 1,200 feet. The final moving assembly is 408 feet long and has a capacity of thirty-eight cars. The equipment enables the building of fifty cars in 9 hours, which is a much greater output than Packard ever could possibly have attained previous to the installation of its maze



Hudson unloading scheme

of tracks last year. The frame starts upside down in much the same way as the others, and it moves along until axles, motor, steering gear and lesser parts are in place.

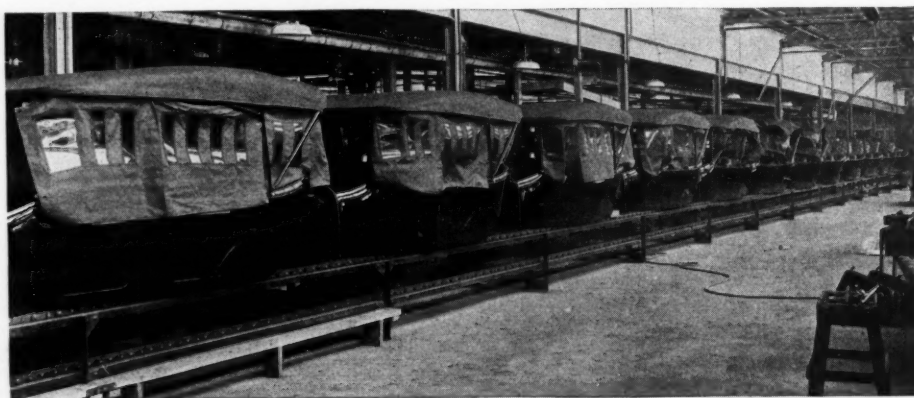
#### Applying the Paint

Then the first painting operation begins. Under a huge hood to carry away the fumes, the first coat is sprayed on. This is the ground coat, a primer having been put on before assembly started. It then goes back through a 126-foot oven which is at a temperature of 120 degrees. This baking done, the chassis comes out of the oven and reaches another spraying hood to receive its finishing varnish. Then follows another oven visit for a similar length of time at a temperature 10 degrees higher. Leaving this, the chassis runs along for 96 feet to cool and reaches a final spraying point for a finish varnish that is allowed to air dry over night. Here the truck goes on to a storage track where it stands still until ready for the final assembly the next day.

The truck later is run along a track to the last assembly room, and hooked to the moving chain that pulls the chassis to completion. This assembly is of the body, fenders and external parts, most of the mechanism having been added on the previous trip, as we have seen. A hole in the ceiling overhead permits the body to be let down onto the chassis when it gets to this point, and at the finish, the conveyor truck drops below the car as it is driven off on runways.

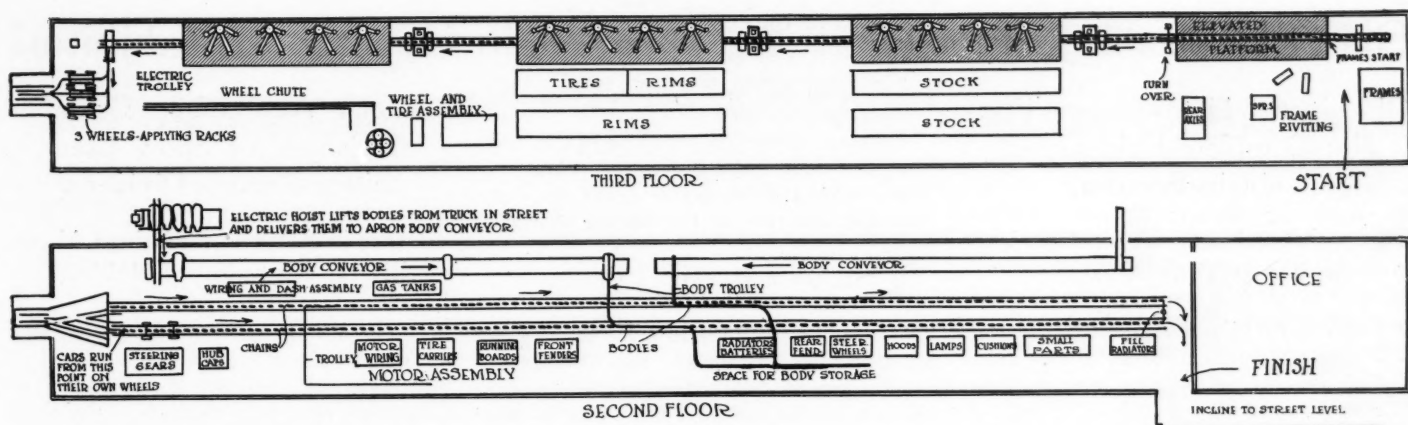
Hudson has had its conveyor system in operation for several years. The factory has an ideal layout for this kind of assembly, for there is a long building at the front and other sections run back from

it is taken off the truck by an electric hoist and placed on a stand where the wheels are assembled to it. The conveyor truck, relieved of its load, automatically returns to the other end of the track on an underneath track. The wheels in place, the hoist lowers the chassis through a chute in the end of the building where it automatically is released from the hoist and starts on the 690-foot chassis conveyor. In this case, the cars are pulled along on their own wheels by a hook attached to the frame and

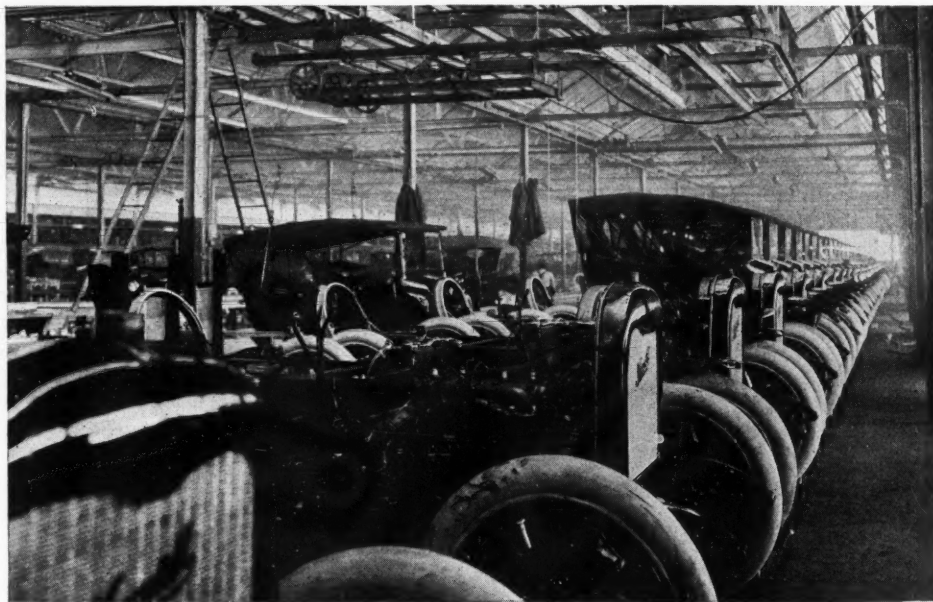


Each body is a step nearer completion. They are moving gradually to the point where they will be picked up by an electric hoist and set on their chassis, as the latter reach that point in their growth into complete motor cars. View in Maxwell factory





The Paige factory is a very well-designed plant. Unlike most others, it is arranged so that the cars get their wheels and tires as soon as the chassis are painted and finish their journey on air



Long line of chassis and cars that move 40 inches a minute, each inch bringing them closer to completion. The point where they receive the bodies is clearly shown. Courtesy of Maxwell Co.

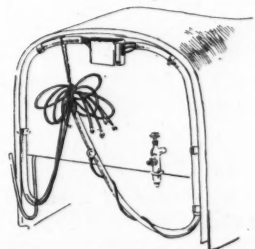
it at right angles. Thus the chassis, bodies and other parts can be brought out of their wings to meet the progressing chassis that are moving along the main building. Traveling down the first floor of the end wing, the frames have axles, steering gears and other parts assembled to them. Then they are taken up on an elevator to the painting room above. Here they go back and forth through the various stages of baking and spraying and finally pass out to be placed on the final assembly conveyor at the end of the main building. Moving along on this track, all remaining parts, and body, fenders, wheels, etc., are put on. Finally at the other end of this floor, the truck is wheeled off and a track brings it on to an elevator which lowers car and truck to the ground floor. Leaving the truck here, the car goes out for final test and inspection while the truck returns to pick up another frame.

We have outlined four widely different modifications of the moving assembly scheme, showing how it is used successfully in the construction of cars in four price classes. These will give the reader a general idea of how quantity output has

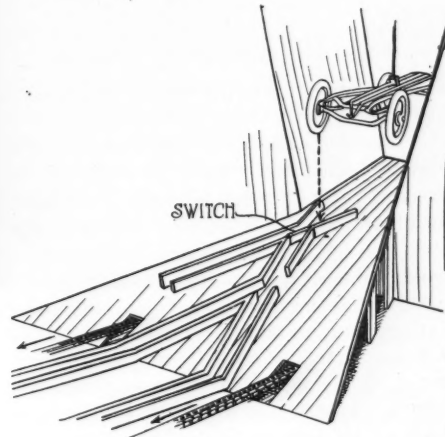
been possible without sacrifice of quality and how efficiency firmly has entrenched itself in the workings of the big motor car plants. There are others no less interesting and complete, but space does not permit of a detailed outline of them all.

Suffice to say, however, every big manufacturer of motor cars has found it very necessary to give the car buyer all of the modern improvements and usually at a lower price from year to year. Unless each one makes a study of manufacturing efficiency, he cannot hope to produce a car that can be sold at an ever-decreasing price, when material entering into their production keeps skyrocketing until there seems no limit to its soaring.

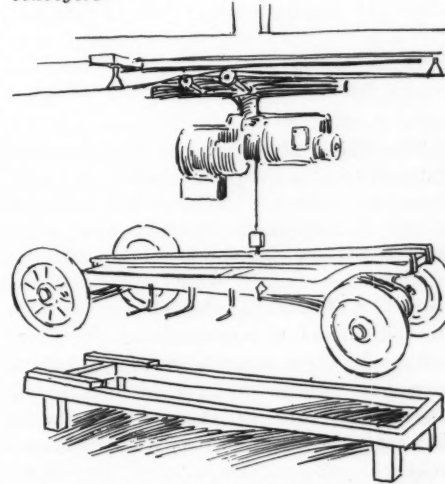
The making of motor cars has long since ceased to be a business of turning out playthings for the plutocrat; the proletariat, so to speak, demands his share, and it must fit his purse. Knowing that there is a profit in selling a good car at a low price, it only remained for the manufacturer to solve the production process, and this has been done largely by the institution of traveling conveyors where cars, like time and tide, wait for no man.



Wiring on body of Paige, all ready to attach when body is lowered on chassis



When chassis has received wheels it is dropped to the second floor, where a clever switching arrangement directs it by gravity to one of the conveyors



Electric overhead trolley which picks up chassis, carries it to shaft and lowers it to switch

## Oh! Ye Honorable Judge!

### Ohio Justice Holds License Plate Not Complete Evidence of Guilt in Speeding

#### Officer Must Prove Defendant Was in Car at Time of Arrest

CLEVELAND, Ohio, March 4—A decision of much importance to owners and drivers of motor cars was rendered this week by Judge Homer C. Powell of the common pleas court, when he reversed Mayor August C. Fortlage of the village of Dover, who had imposed a fine upon R. W. Parker on the charge of exceeding the speed limits as defined in the statutes. This is the first time that a court of record in this city has gone into a case as was done in this one.

The most important question presented by the record of the case, the court said, is whether an owner of a car can be arrested, convicted and mulcted by fine and costs solely upon proof that his car was seen going along a public highway at a rate of speed greater than that permitted by law.

#### Over-Scrupulous Justices

The common use of cars for pleasure has given birth to an industry by which certain not over-scrupulous justices and special constables have materially increased their incomes without great labor on their part. Recognizing the fact that the average citizen is not familiar with court proceedings and so abhorrent to arrest that he will pay from \$10 to \$15 rather than go through the ordeal, these officers station their minions under shady trees along much traveled highways on Sunday afternoons and the license numbers of all prosperous looking drivers are taken, without regard to the speed of the machines. A few days later the owners receive notice to appear before some justice in a remote part of the county to answer the charge of violating speed laws. They are usually advised that if they will plead guilty they will be assessed a nominal fee of fine and costs. Since this seems the easiest way to escape, the fines usually are paid.

The driver of a car, he said, is certainly entitled to as much consideration as a murderer or highway robber. The law surrounds a suspected crook, when arrested, with every safeguard. He is presumed to be innocent until proven guilty. Every essential element of his crime must be proved, beyond a reasonable doubt, before he can be convicted. Is it such a heinous crime for a man to take his family out for a ride that he thereby forfeits his right to be treated equally as well as a robber?

The affidavit in this case, says the decision, was based upon a section of the gen-

eral code of Ohio, which provides as follows:

Whoever operates a motor vehicle at a greater speed than fifteen miles per hour shall be fined not more than \$25.

Before a conviction could be had in this case it was necessary for the village to prove beyond a reasonable doubt the two essential elements of the offense charged, namely:

1. That the law had been violated—the corpus delicti.

2. That the plaintiff in error is the person who violated the law; that is, that he is the person who operated this motor vehicle on the day in question at a rate of speed greater than 15 miles per hour.

The corpus delicti is established by the testimony of the deputy marshal. But another step is necessary to produce conviction—the identity of the person charged. The evidence as to the identity of the person operating this motor vehicle on September 19, 1915, is wholly circumstantial, and is based solely upon the testimony of Fred Smith, deputy marshal of the village of Dover. He testifies in brief that he was out catching speeders on the afternoon of September 19, 1915; that he observed a machine on Bradley road which he thought was exceeding the speed limit. He confirmed his suspicions by giving chase for about ½ mile on his motorcycle, which registered a speed of 32 miles per hour. He said he made note of the number, which was 47,311.

#### STOCK SALESMAN ARRESTED

Uniontown, Pa., March 7.—Upon complaint of Charles W. Johnson, proprietor of the Standard Automobile Garage of this city, F. A. Chapman, an agent of the International Automobile League, Inc., of Buffalo, has been placed under arrest on a charge of obtaining money under false pretenses. The authorities are seeking to locate Harry Ames Van Auken, who worked in this territory as an organizer and salesman for the league prior to the arrival of Chapman. He was last reported at Charleston, Va.

Both men carried credentials signed by A. C. Bidwell, president of the league, identifying them to prospective members as officers of the organization. They offered to sell accessories at a large discount to garage men who would pay the membership fee of \$10 or subscribe to International Tire League stock. Claims amounting to \$30,000 have been made against the pair, say the attorneys who represent Mr. Johnson and other claimants. Altogether about \$150,000 in stock is said to have been subscribed by garage owners of eastern states.

Van Auken is wanted by the Michigan authorities for having broken parole after being released from the state penitentiary, where he was serving a term in 1910. A suit is pending against Chapman at Camden, N. J. The International Automobile League has been involved in difficulties elsewhere.

## Rebates to Exhibitors

### National Automobile Chamber of Commerce Show Committee Reports Dividend

#### Increase in Attendance Brings About Big Return to Space Holders

NEW YORK, March 3—At the regular quarterly meeting of the members of the National Automobile Chamber of Commerce, Inc., held yesterday, the show committee reported that 120 per cent will be returned to the exhibitors at New York and 102 per cent to those taking space at Chicago. This excellent showing is entirely due to increased attendance, the public paying approximately 30 per cent more than last year for admission to the shows.

The traffic department report showed that carload shipments of motor cars during February were larger than in any month in the history of the industry. The freight car shortage is causing considerable inconvenience to the manufacturers, while the increasing difficulty of obtaining cars has been responsible for numerous delays in delivery. Many manufacturers have also been obliged to utilize flat-cars, while it is becoming frequent for cars to be shipped with fenders removed so that the narrow-door box-cars can be used.

About seventy-five manufacturers were represented at the meeting. W. C. Leland, vice-president of the chamber, presided.

#### GOOD ROADS CONGRESS

Pittsburgh, Pa., March 4—Systematic studies by city, county and state governments of the performances of various road materials under actual wear by means of periodical traffic censuses, were suggested as a means of helping the good roads movement at the sessions yesterday of the sixth American Good Roads Congress and the thirteenth annual convention of the American Road Builders' Association, at the exposition buildings. The suggestions were embodied in resolutions passed by delegates. The censuses were suggested as a means of determining definitely the economic value of the different types of construction and pavements.

Other resolutions adopted at yesterday's gatherings suggested that in the future bonds for road construction be of the serial type, which may be paid off year by year, rather than the type which are wiped out at maturity by means of a sinking fund. It was also urged that the various states pass laws establishing reasonable limits for the weight, dimensions and speed of heavy motor vehicles. The association likewise went on record as favoring a system of properly located and improved highways as a matter of military preparedness, and expressed its gratitude to the press of the city and country for having aroused the



people of this nation, as well as Canada, to the importance of the good roads movement.

#### STUDEBAKER INCREASES PRICE

Detroit, Mich., March 4.—Studebaker prices were increased March first for several of its models by the Studebaker Corp. In the four-cylinder series the three and seven-passenger models which formerly sold at, respectively, \$825 and \$845 now sell at \$850 and \$875 respectively, while the landau-roadster which sold at \$1,145 is now listed at \$1,150.

Among the six-cylinder models, the three-passenger roadster now sells at \$1,060 instead of \$1,025 and the seven-passenger touring car is listed at \$1,085 instead of \$1,050. The landau-roadster at \$1,350; the four-passenger coupe at \$1,600; the sedan at \$1,675, and the seven-passenger limousine at \$2,500 remain unchanged in price. Neither is there an increase in the prices of the commercial car line.

#### MUSCATINE'S FIRST SHOW

Muscatine, Ia., March 5.—Muscatine's first motor car show, held in the armory under the auspices of the newly organized Muscatine Auto Dealers' Association, ended last night after a successful 3-day run. Thirty pleasure cars and a large number of accessories were shown. The Armory was tastily decorated in black and white. Attendance was near the 3,500 mark.

#### DALLAS STAGES SPRING OPENING

Dallas, Texas, March 4.—Dallas' spring show is on. It began Tuesday night and will continue the entire week. It began with a great parade of decorated, electrically decorated motor cars. It is estimated that 75,000 people lined the streets to witness the spring exhibition. People came from all points of Texas. Every hotel in the city was crowded with visitors.

The parade began with the new models, electrically decorated, and ended with other cars also brilliantly decorated. In the contest for prizes the Cadillac machine entered by the Munger Automobile Co. took first prize.

#### CEDAR RAPIDS HAS SHOW

Cedar Rapids, Ia., March 5.—Fourteen dealers exhibited thirty cars at the seventh annual exhibition of the Cedar Rapids Automobile Association held here this week in the Russell auditorium. In point of attendance it was the largest show that the association has ever held. There were four out-of-town dealers in the list of exhibitors. The first sale was made by Champlin & Killeen Co., who sold an Apperson.

One of the booths was given over to the woman suffrage campaigners, who sold buttons to finance the propaganda here. A free class in motoring, including lectures on all phases of operation, was given in connection with the show.

## Horsepower and License

### Colorado Motorists Displeased With Methods of Taxing Their Cars

#### Protest Paying on Advertised Rating of Vehicle's Power

DENVER, Colo., March 1.—A great deal of complaint is being made by both car owners and dealers against the provision in the Colorado motor vehicle license law that license fees must be paid solely according to the horsepower rating advertised by the manufacturers. This feature of the law, which is being enforced more rigidly this year than ever before since the law went into effect in 1913, costs hundreds of owners \$2.50 or \$5 more than they would have to pay on the basis of such a standard rating as that established by the Society of Automobile Engineers.

Then, the owners complain to the dealers because the manufacturers persist in advertising a 38.4 horsepower car as having 48 horsepower, for instance, and thus compelling the man who buys this car in Colorado to pay \$10 a year license fee instead of only \$5. The dealer, in turn, denounces the law, and declares that he is going to see to it that the state license law is properly amended at the next session of the legislature to base the fee upon the S. A. E. rating, regardless of what brake-test or other rating the manufacturer advertises.

The Colorado license fees are \$2.50 for cars up to and including 20 horsepower, \$5 for above 20 and up to 40, and \$10 for above 40. While these charges are far lower than the license fees required in many other states, the average owner is nevertheless strongly opposed to paying for more horsepower than his motor produces upon the S. A. E. basis, which is the basis upon which he pays his car insurance.

A few dealers are fortunate in handling cars having an advertised horsepower the same as the S. A. E. rating, or at any rate not in a higher fee class, but the majority are having a heap of trouble on that score. And some of the dealers claim that there is serious danger of losing a sale in favor of a car calling for a lower license fee, while perhaps at the same time developing practically the same actual horsepower and pleasing the prospective customer equally well in most other respects.

On the other hand, the nearly 10,000 Ford owners in Colorado save \$2.50 apiece because the law says they shall pay upon the basis of the advertised rating of 20 horsepower instead of the S. A. E. rating of 22.5.

A measure providing that the license fee should be based upon the S. A. E. rating was put through the legislature a year ago by the Denver Motor Club and

the Automobile Trades Association of Colorado, but it contained several other provisions and was vetoed.

#### MARYLAND TRUCK LIMIT 8 TONS

Annapolis, Md., March 4.—Under the provisions of a bill introduced in the general assembly here, no commercial motor vehicle with capacity of more than 8 tons will be permitted to operate in the state. The bill also proposed greatly to increase the license fees paid by all commercial vehicles. At present all the commercial vehicles in the state pay the flat rate of \$3 a year. This bill, which has been introduced, provides that cars of this kind, with capacity of not more than 1 ton, pay \$15 a year; those of more than 1 and less than 2 tons, \$20; \$25 for those between 2 and 3 tons; \$30 between 3 and 4 tons; \$35 between 4 and 5 tons; \$40 between 5 and 6 tons; \$45 between 6 and 7 tons, and \$50 between 7 and 8 tons.

#### COURSE IN MILITARY MOTORS

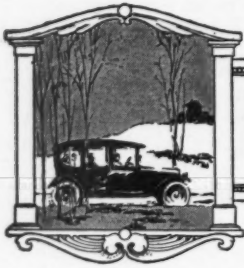
University of California, Berkeley, Cal., March 4.—Members of the Officers' Club, an organization composed of commissioned officers of the university cadet corps, have taken up the study of motor cars as factors in military operations. The cadet officers realize that motor car knowledge is necessary in the education of every well-trained officer in modern warfare in every branch of the service. The course of study being followed by the cadet officers covers mobilization, transportation of artillery and supplies, the operation of field hospital motor buses and ambulances.

#### ADOPT SUBSTITUTE HIGHWAY BILL

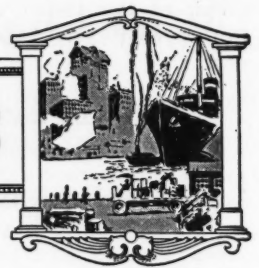
Washington, March 6.—The senate committee on postoffices and post roads has adopted a good-roads bill as a substitute for the Shackleford house measure, and the members of the committee propose to push this substitute vigorously. The committee members say the house measure was objected to because of the fact that it appropriated a very large sum of money at the beginning of the operation of the law.

The senate bill would appropriate \$5,000,000 for the first year the law is in operation, and this money would be divided among the various states on a proportion basis, taking in population, etc., practically as the house bill does. Each state would get a minimum sum for the first year, and this sum would increase proportionately for each of the next four years. In this way, it is suggested, the states would get the federal aid but the money expended would not go out in such a large sum in the near future, and the demands for economy at the present time would be heeded.

The action of the senate committee is expected to precipitate a lively fight between the senate and the house. It is expected that the senate will approve the action of its committee and, in that event, a conference committee will have to be appointed to work out the differences.



## EDITORIAL PERSPECTIVES



### Psychology in Racing

NOT 10 per cent of those attending our 500-mile races on the large speedways are motorwise enough to follow the events without considerable mental effort. It is the most difficult thing in the world to follow a 500-mile race, to keep advised on the positions of the cars in the lead, how many laps the leader has over the second car, and how many laps are cars three, four and five. Occasionally some effort will be made to check up where the first ten cars are and if thirty machines start in the race, it is quite impossible to give any attention to the last twenty. There are altogether too many cars on the track, and the means for advising the public of what happens are entirely inadequate.

SURELY it is scarcely necessary to have a 2-mile speedway literally filled with cars to satisfy the sporting tastes of those who attend. Often there are so many cars on the track that the race is bewildering even to the most motor wise, and as for the spectator, seeing the cars for the only time during the year, the race resolves itself into a mere spectacle, and a day's outing. The mental load is too great and the means of keeping the spectator advised not up-to-date.

THE baseball game is a good ideal to follow. The electric signal board tells you before the game starts who the pitchers will be, who will be behind the batter and when a batter walks to the box his name is signalled. No sooner is a ball

pitched than the stands know whether it is a strike or a ball. It is all done instantly. There is no suspense. You live the entire game as it moves along. Without much effort you know exactly what is happening.

APPLY this to the speedway. Why not use a large electric signal board scheme so the second a car slows up at the pit the name of the car or driver is signalled. You are also advised whether the stop is to change a spark plug or a valve. The person who has paid \$5 or \$8 for a grand stand seat has a right to such information, to such service.

GO further: Signal each lap or every five miles the speed the leading car is making. Signal the length of time required to make a tire change at the pits. Signal the length of time required to fill with gasoline. When the two fastest cars pass the grand stand side by side signal if they are in the same lap or if one is two or three laps ahead of the other. All of this work will add dollars to the speedway coffers.

YOU do not need a different signal system for each speedway. Get one good system and use it for all of them. This will reduce the expense and will be an assurance that those operating the system will become expert at it and mistakes will be obviated. Standardization in this work is essential.

### Wash Your Car

IT is poor business to let your car get dirty, to get it covered with mud and leave it for several days without being washed. Perhaps you keep the car in your private garage and you have no facilities to wash it. Perhaps you store it with your garage-man for \$6 per month and only have it washed occasionally. It makes no difference what the conditions are, the fact remains that it is generally money out of your pocket to keep a dirty car.

FIRST: A dirty car is a poor advertisement to any business man, to any farmer, to anybody. None of us likes to wear dirty collars. We are not proud of dirty cuffs. We get our hair cut when it gets a little ragged at the back. We shave every day because our whiskers are black and are not conducive to a good business appearance. We like to keep our homes well painted. We take a pride in keeping the grass well cut on the front lawn. We are proud of our wife because she has the reputation for being the cleanest housekeeper in the community.

SECOND: Why not keep the car clean? There is no legitimate reason why you should not. If it costs you \$40 to get the car painted, and that without having the old paint burned off, then it is good business to get the car washed more often so it will not be necessary to get the painting done each year. There are plenty of cars that are washed regularly and that are not painted oftener than once in three or four years. With that treatment they look much better than some cars not three months old that rarely see the wash rack. Personal appearance

pays. We all believe it does. Then apply it to your car. Wash up more for 1916 than you did for 1915.

THIRD: Dirt hides defects, broken parts and keeps you from seeing the exact condition of your car. One car owner acknowledged that he did not know there was a grease cup on the swivel joint of the speedometer until after the flexible shaft had broken and he had to buy a new shaft and a new swivel joint. Dirt was the reason. Only recently a car was seen in a garage in which the outside bearing in the rear axle had broken, due to lack of lubrication. There was a grease cup to oil the bearing, but it was covered with dirt. The owner had forgotten about it. New bushings in radius rods are often necessary because there is so much dirt on the chassis that many of the grease cups are neglected.

FOURTH: There is a danger element in not keeping the parts of the chassis clean. You cannot afford to have the steering parts so coated in dirt that you cannot regularly inspect them to see if any parts are working loose, or if any defects are exhibiting themselves. You may have a cracked spring leaf that cannot be detected because of the dirt. Later this cracked leaf may lead to breaking all of the leaves.

LASTLY: As a business man with money enough to own a car, we gravely question if you can afford to ride in a dirty machine. Surely your wife does not care to. Your daughters do not. For \$52 you can have it washed every week in the year. It is worth while.



# Why United States Roads Are Charles-the-Second Highways

## Conditions Described by Macaulay in 1685 Exemplified in This Country

**H**ISTORY is all the time repeating itself, and men in the large do not learn very much from experience. So-called pure democracy is not new to this day and time. There is something among the ancients to match the worst and the best in this generation. The United States is not the only allegedly civilized land which has been cursed with bad roads. England was as bad off 300 years ago as this country, generally speaking, is now. Writing of the conditions in England in 1685, Macaulay said:

"The chief cause which made the fusion of the different elements of society so imperfect was the extreme difficulty which our ancestors found in passing from place to place. \* \* \* In the seventeenth century the inhabitants of London were for almost every practical purpose farther from Reading than they now are from Edinburgh, and farther from Edinburgh than they now are from Vienna. It was by the highways that both travelers and goods generally passed from place to place. \* \* \* On the best lines of communication the ruts were deep, the decents precipitous, and the way often such as it was hardly possible to distinguish, in the dusk, from the uninclosed heath and fen which lay on both sides. \* \* \*

### Stuck in the Mud

It happened, almost daily, that coaches stuck fast, until a team of cattle could be procured from some neighboring farm to tug them out of the slough. \* \* \* In some parts of Kent and Sussex none but the strongest horses could, in winter, get through the bog, in which, at every step, they sunk deep. The markets were often inaccessible during several months. \* \* \* The wheeled carriages were, in this district, generally pulled by oxen. When Prince George of Denmark visited the stately mansion of Petworth in wet weather, he was 6 hours going 9 miles. \* \* \* One chief cause of the badness of the roads seems to have been the defective state of the law. Every parish was bound to repair the highways which passed through it. The peasantry was forced to give their gratuitous labor 6 days in the year. If this was not sufficient, hired labor was employed, and the expense was met by a parochial rate. The rich commonly traveled in their own carriages, with at least four horses. \* \* \* People in the time of Charles the Second traveled with six horses, because with a smaller number there was danger of sticking fast in the mire. Nor were even six horses always sufficient."

All this was the condition of highway traffic in England 231 years ago, and it can be duplicated in many parts of the United

States today. Among the pictures in the office of the American Highway Association at Washington there is a striking painting of precisely the same sort of thing that obtained in Mecklenburg county, N. C., only a few years ago—four mules pulling a wagon loaded with two bales of cotton over a Charles-the-Second highway, and by contrast two mules pulling eight bales with several colored field hands as necessary ballast to make the load comfortable, at a spanking pace over a modern highway for which this revolutionary county was at one time famous. It has been estimated by careful government experts that only about 150,000 miles of really first-rate modern highways are to be found in the United States—the total mileage of public roads in January, 1915, was 2,273,131. The total mileage of all surfaced roads was 247,490, and it has been very nearly 300 years since

our first American parents began to appropriate the lands of the aborigines so that they might redeem this land and make it the habitation of civilized peoples!

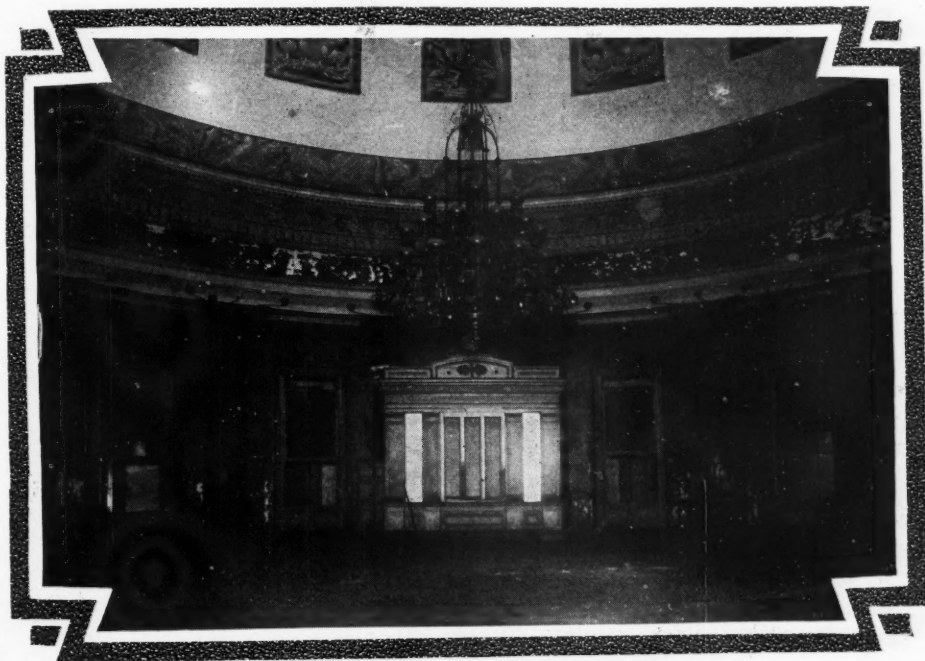
### Parallel of Archaic Times

There are many striking parallels between the United States now and England in the time of which Macaulay wrote. The most of the public roads here are little, if any, better than were the roads when Charles was king. In his time the people objected to the paying of taxes for the construction of good roads. They do now in this country. They protested against working the roads then; they do now in this new land of light and liberty.

Isn't it strange that, with the history and experience of all the countries of the Old World to guide and warn, the United States should have chosen to make the same old mistakes on its own account?

# See America First —

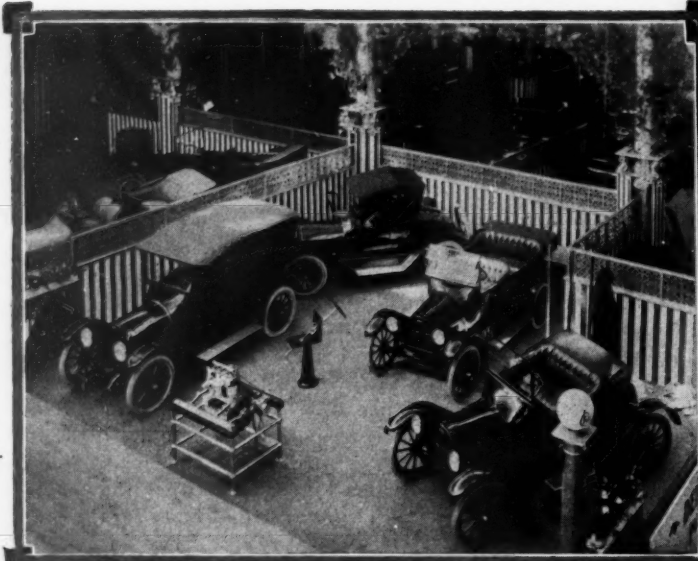
# • • • See America Now



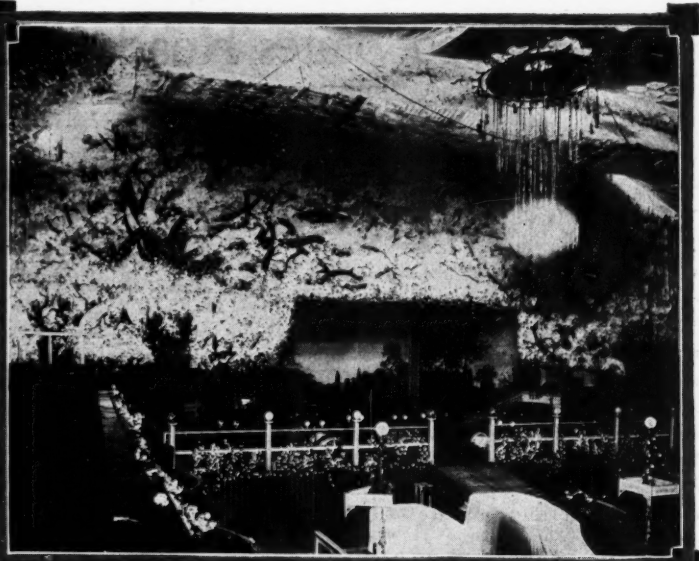
**EDITOR'S NOTE**—This is the sixty-ninth of a series of illustrations and thumb-nail sketches of the scenic and historic wonders of America to be published in *Motor Age* for the purpose of calling attention of motorists to points of interest in their own country.

**NO. 69—ROTUNDA OF OLD HOTEL ST. LOUIS AT NEW ORLEANS, LA.**

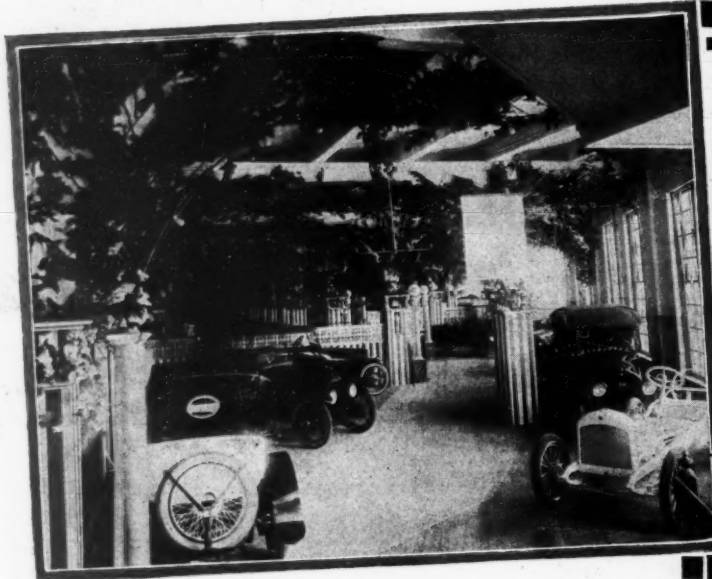
**T**HE Crescent City boasts of its many old buildings and landmarks of the early days when the United States was divided among several nations. Besides the momentos of the early days there are many buildings that do not date back so far, but nevertheless have been important links in the chain of circumstances that stand out clearly in Louisiana life. Above is shown the top part of the rotunda of the old hotel St. Louis. The flooring was added when the state used the building as the state capitol. It spans the space above the second floor and was used as the senate chamber.



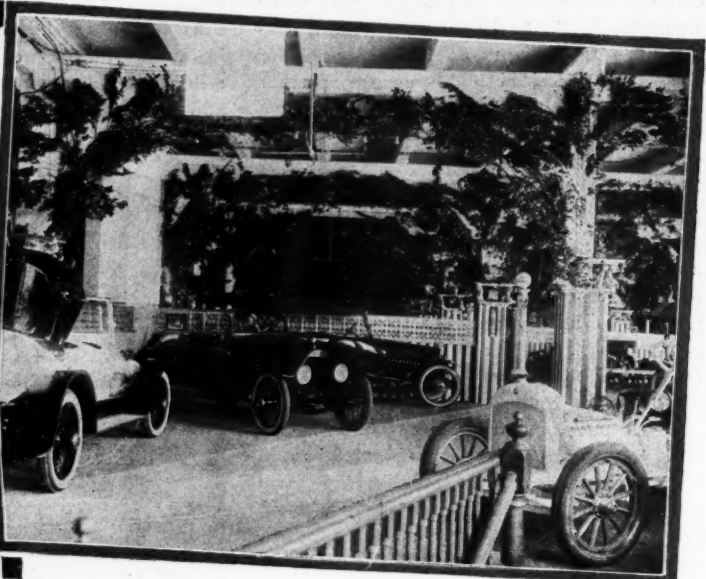
Showing how an exhibit is entirely enclosed by the black and white partitions in Mechanics' building. The exhibit is the Chevrolet



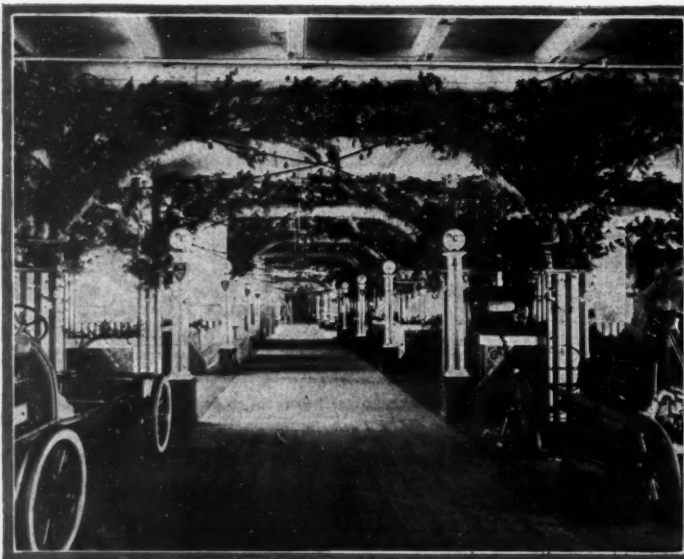
Huge floral procession arch in Grand hall with scenic setting



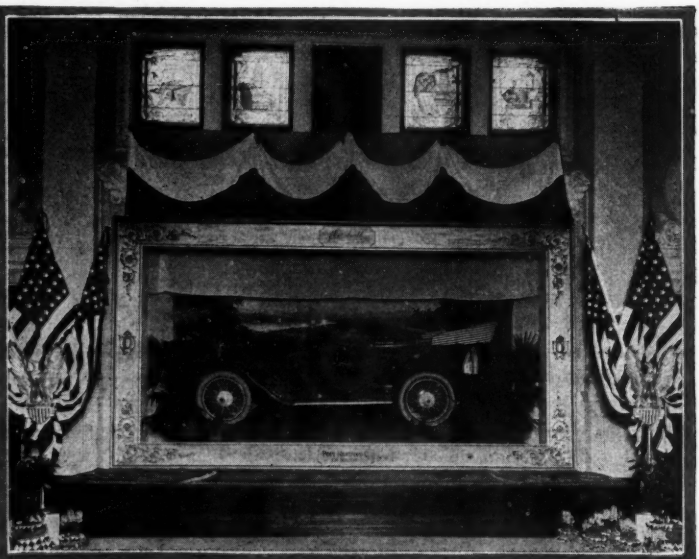
The black and white in Mechanics' building is very effective, particularly the long lines of pillars and arches



One of the vistas in Mechanics' building with Owen magnetic exhibit in foreground

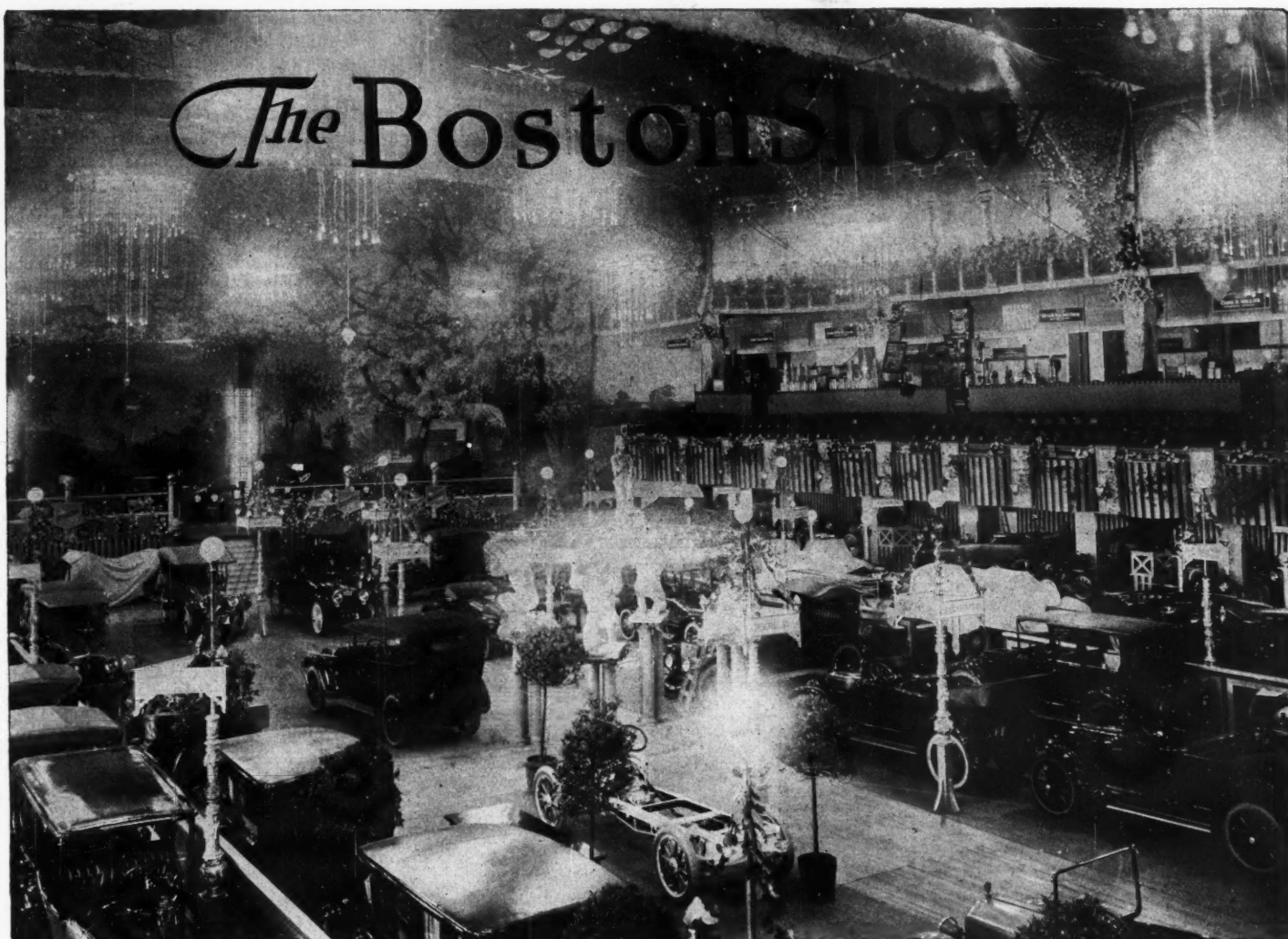


View of promenade in Exhibition hall, where thousands passed to and fro in inspecting the 1916 models



The stage in Paul Revere Hall with the Mitchell touring car in blue set into the landscape and surrounded by a huge gilt frame





*Bird's-eye view of Grand hall, giving a good conception of the magnitude of Boston's car exhibition*

## Late Body Styles Feature of New England Exhibition

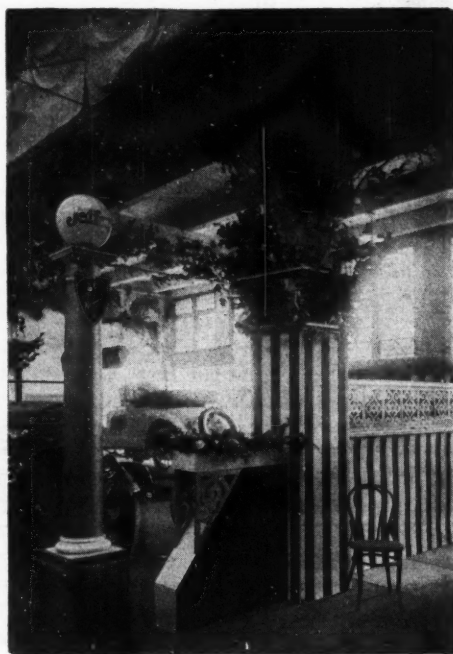
By David Beecroft

**B**OSTON, March 4—Boston is in the grip of its fourteenth annual motor car show and also is in the grasp of nearly 16 inches of snow that has been on the ground since Washington's birthday, and which has been able to hold back sales in New England, but fortunately is powerless to hold back the crowds from all six states attending the show.

### Previous Decorations Outdone

At 2 o'clock this Saturday afternoon Manager Chester I. Campbell, whose name is synonymous with Boston motor shows, opened the doors on the most attractively gotten up show stage, artistic, educated Boston has ever gazed upon. He has caught the public taste with bold black and white effects, so fashionable today; he has mixed these with a glint and glitter of tinsel in his lighting scheme not heretofore attempted; and he has added his foliage effects for arches and ceiling thus converting the barn-like interiors of Grand Hall and Mechanics' building into as pleasing and brilliant a color combination as ever seen. Decorating is not an easy task but in Boston show with its two separate exhibition halls the problem is a hard one.

It is meet that Boston should outdo it-



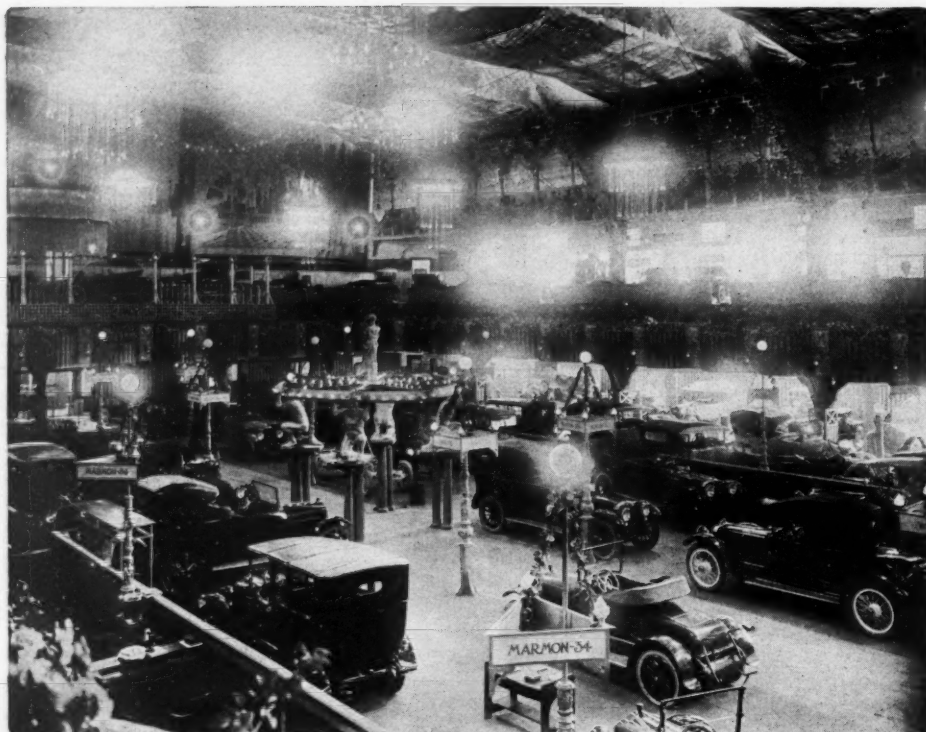
*The arches, foliage and the oblong flower stands won general admiration from the throngs who came each day*

self at this 1916 show for 1916 promises by a wide margin to be the greatest year the six states have ever known. New England is today on a 24-hour schedule of manufacture and production. Her machine tool industry works every hour of the 24, has been on this schedule for a year or more and gives promise of having to continue on it for 5 or 6 years, the way orders are being received. But the machine tool industry is third, not first, and leading it are textiles and leathers. Both are at their zenith.

### Much Pride in Show

Boston always has taken a particular pride in its annual motor show. It is not a Boston show but a New England show. True it is staged by the Boston dealers' association but the attendance is New England. Instead of the show being a retail one for Greater Boston it is a retail show for New England. Over 3,000 New England dealers will be in the city within the next 7 days. They are here primarily for the show. With them come thousands of business men, manufacturers of sundry lines, farmers, everybody owning a car today and the thousands who hope to buy their first car during 1916.

Buying cars in New England is like



General view of Grand hall, decorated in scheme of gold and white

fashions in France. You must buy in Paris. That is the center, Paris is the last word. So with Boston it is finality in motor car lore in New England. The dealers realizing this have set about to stage a real show. They have generally ordered special cars for it. Here are cars in a score or more of serviceable colors, not all staid black, yet not the fussy show jobs that have to be repainted before being sold. Here is a larger display of color than seen at any other show this season, not even excepting New York and Chicago. No wonder fashionable New England looks upon Boston show as the Paris of motor car styles. No wonder, Maine, New Hampshire and Vermont, send their thousands each year to The Hub. No wonder that even Massachusetts, Connecticut and Rhode Island are also present in overflow numbers.

#### Boston Is Heavy Buyer

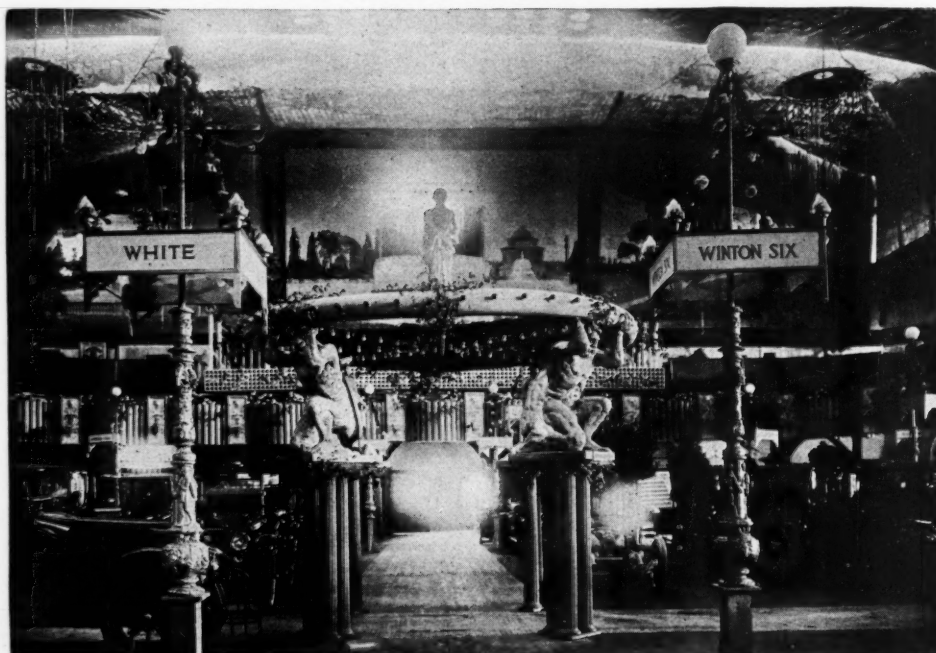
In 1915 New England purchased 39,331 motor cars. This year she hopes to purchase 50,000 cars. The six states are conservative in this estimate. The entire territory is quite capable of consuming 25 per cent more cars than last year. To date sales are with many distributors more than double those of a year ago. Dealers in Maine are ordering carload lots whereas a year ago they would not take single cars. Boston is enjoying the great prosperity of the territory and is a much heavier buyer than a year ago.

During the last year New England has been losing ground as a center of car population, the honors being carried off by states in the great agricultural valley of the Mississippi. In spite of this she sold 26.9 per cent more cars in 1915 than she did in 1914. But while she has gained

A year from today she hopes to have 135,000 machines. She would need 450,000 machines before her car-to-population ratio would equal that of Iowa. With this thought in mind why think of the saturation point, a topic that so many doubting Thomases like to discuss. The motor car saturation point in New England is not yet in sight. It is so far remote as not to be worthy of consideration. New England should be able to absorb 75,000 cars per annum for years. This is practically double the number sold during 1915.

#### The Prosperity Gauge

New England's capacity to purchase cars is best understood from an analysis of her five leading industries, textiles, leather, tools, agriculture and lumber. Add to these her scores of varied sources of wealth and it has been conservatively estimated that she has \$500,000,000 that might be termed unexpected money. This means profits, so to speak, above the average. If only 10 per cent of this extra money were spent in motor cars it would purchase 50,000 cars listing at an average of \$1,000 each. But if 20 per cent of this were spent in motor cars there would be a



The huge tire in the center of Grand hall supported as it is on the shoulders of four figures, typifies Industry, Progress, Invention and Success

26.9 per cent, some of the great central states have gained 40 per cent; and while New England boasts of one motor car to every thirty-eight people, there are states in the central states with one car to every fourteen people and in these states are counties that claim one car to every seven people in the county. It is almost impossible to hope for such a ratio in New England with her great areas of mountains, her great areas of lakes and other large areas owned by citizens of other states who count New England as their summer home from May to September.

New England today has 185,363 cars.

market for approximately 100,000 machines.

New England's prosperity of the last 18 months is a real prosperity, not an imaginary one. Port Fairfield is in this county and one car distributor in Boston has recently received an order for fifty carloads of his cars, 100 machines. This is a condition unheard of from that section. Look over all of New England and similar increases in business are seen. The increased sales will be gained throughout the six states. The sale of used cars has increased greatly in the year, in fact, this phase of the business is in better condition than ever before.



Reverting to Boston show: The show is revealing many changes in the general trend of the industry in the six states. Closed cars are making very pronounced headway, this not only in Boston, but in all the states. The progress is slow in such Vermont centers as Burlington, Rutland, Montpelier and Barre, where very few cars are seen on the streets in the winter. In one of these cities only five cars were on the streets in two weeks recently, according to a Boston distributor. The same is largely true in New Hampshire. The cities in Maine along the Atlantic coast enjoy a climate moderated by the saltwaters of the ocean and so can use their cars to advantage all winter, while those cities further inland have to lay them up because of heavy snow falls and cold weather.

#### Sedan Is Popular

The sedan is proving a popular New England car not only in Boston but outside as well. It is the ideal family car. The same is true of the detachable winter body, which has not been on the market so long and is none the less gaining rapidly. Coupes are not in demand. The conventional coupe accommodates three people, and for a winter vehicle that is not enough. There must be accommodation for four. Boston is a good limousine town. The Berline is not known at all, in fact, Minneapolis, seems to be about the only city where the Berline type is in demand.

An official count of the different styles of bodies at the show generally reveals the types of bodies most in demand. This cannot be taken without modification, because today the selling period of closed cars is over and naturally touring cars and roadsters are featured. There are more closed cars shown than might be expected because several Boston dealers were not able to get their closed types early in the fall. Instead of getting them in October, they came through in December and then in small quantities. Many distributors are quite emphatic in their con-

demnation of manufacturers who disappointed them so seriously in the closed car business. Some of the makers in turn were held up by labor troubles. The net result is that the maker does not start his closed car business early enough. He should lay his program out in May and have them in the dealers' hands in September. This is true for Boston and is equally true for Minneapolis, Kansas City, Omaha and many other western cities that are rapidly developing closed car business. The creation of local body builders. Others have originated in New England where there are many highclass body manufacturers. The most original body style seen and one which gives promise of being largely copied in the next few years is a four-passenger Locomobile touring car with a hinged cowl and windshield for the tonneau. The cowl carries a sloping windshield just as the dash cowl and practically as large. This tonneau cowl hinges to the back of the front seat and is raised when passengers enter. The windshield is back close to the passengers and are protected by a Victoria top. The body is a very attractive one. It is the first time this hinged form of cowl and windshield have been seen. The combination should prove popular and should be widely imitated. The body is the biggest interest center in the show.

Kissel has a new form of four-passenger roadster with disappearing rear seats. The front seats are individual with a passage between them to the rear, and when the rear seat is folded into the body and out of sight this passage is filled by a hinged filler board. This filler board swings back into the floor when the rear seat is opened. Rear seat passengers sit side by side and there is comfortable room for two. The body was built by McNear, a local builder.

A high-water mark in exhibit ideas is carried out by the Mitchell distributor, the Pope Hartford Co., of Boston.

The exhibit is staged in Paul Revere Hall, a separate room on the second floor of Mechanics' building, the lower floor and basement of which are used for car and truck exhibits. Revere Hall measures 100 by 50 feet and belongs entirely to the Mitchell exhibit. In this attractive room are seven specially painted Mitchell cars and a chassis. Manager Lucas worked out the entire color scheme, the cars being all different and generally fitted with striped slip covers of different colors and cream white wire wheels. One is yellow, and others are maroon, green, Yale blue, red, and dark blue. On the small stage at one end is one of the most attractive exhibit ideas of the show. The stage is framed with a huge gilt picture frame. Within this is a painted landscape of the country Paul Revere made his famous ride thorough and mounted within this landscape is a real full sized Mitchell touring car in blue. From the opposite end of the hall is a real picture, in fact, there is no part of the room from which the idea has not worked out to the greatest satisfaction. On the floor of the hall are rugs valued at \$3,000. The exhibit is perhaps one of the most unique ever staged at a motor show in America.

#### Natural for Boston to Boast

It is but natural that Boston should boast of her great annual show. Counting in her commercial vehicles she has the greatest individual show in the country, surpassing New York and Chicago. Her 269 passenger vehicles compare favorably with New York with 326 and Chicago with 294 this year.

Compared with Minneapolis and Kansas City with approximately 200 vehicles, she is a leader. She stands first as the great dealers' show of America.



Exterior of Mechanics' building and Grand hall. This building is a huge triangle. The narrow end is Mechanics' building and across the wide end is Grand hall

# Perlman Decision Is Viewed with Alarm

## Industry Looks Upon Ruling as Most Momentous Since Selden Patent Litigation

NEW YORK, March 7—Special Telegram—Following the decision of the circuit court of appeals in favor of Louis Perlman in his suit against the Standard Welding Co., a situation has developed which is looked upon by those prominent in the industry as the most momentous since the days of the Selden patent litigation.

The two interests have been negotiating during the last week in an effort to arrive at a satisfactory financial arrangement in regard to back royalties and future payments under the patent, but nothing definite has been accomplished, though both sides have hopes of a successful adjustment. Should the situation result in a deadlock the consequences to the motor car industry would be far-reaching, as may be realized when it is considered that over 700,000 of the cars to be made this year will use demountable rims and that a large percentage of the output is furnished by the Standard Welding Co. If the injunction against this firm went into effect all demountable rim manufacture in its plant would be stopped and this in turn would hold up the car manufacturers with a resulting financial loss of such proportions that it would be a heavy blow to the industry.

The Standard Welding interests state that Perlman's demands are exorbitant, and that while they are willing to pay the inventor a reasonable sum and a just royalty on future manufacture they cannot meet the terms he names at present. Perlman's contention is that his claims are reasonable and he has consistently maintained that he seeks an equitable, fair and honorable adjustment for all concerned.

### How Case Began

The United States circuit court of appeals, second circuit, handed down a decision affirming the decision of Judge Hunt, in the United States district court, declaring the Perlman demountable rim patent valid and infringed by the Standard Welding Co. An injunction and accounting order against this company was issued last August by the lower court.

The Perlman demountable rim patent case is of more than ordinary interest because it affects the use of demountable rims on nearly all the cars made and now in service in this country.

The Perlman demountable rim patents were applied for in 1906, and the patent was finally granted after many years of delay in the Patent Office, on Feb. 4, 1913. Perlman, however, was not behind these delays, for both he and his attorneys were insistent upon a prompt issue of the patent, because tire and rim makers and car

manufacturers knew of his invention and had boldly appropriated it, pending the issue of his patent.

The testimony in the lower court showed that in 1903 Perlman completed, and in 1904, in a successful way operated his invention on a Royal car, and that for years, beginning away back in 1900, Perlman was industriously at work upon the repairing of tires, always with a view of inventing means to avoid the delays incident to repairing tires on the road.

### Features of Invention

"Finally, Perlman's patent shows invention, completed by him in 1903. Two distinct features mark the inventions: (1) The demountable rim combination with its locking means; and (2) the short-stem lug combination for clamping the tire to the demountable rim. The invention claimed was based upon a provision for a demountable rim which is loose on the wheel when applied, but is locked by locking means which may be unlocked and thereby may restore the loose condition before commencing removal. This same combination has been adopted by defendant and the same combination as disclosed and claimed in the patent in suit has been taken. Plaintiff disclosed to the defendant the patented invention before defendant began to manufacture demountable rims.

"The evidence requires the finding of infringement and the granting of an injunction and accounting in usual form." **Claims in the Suit**

The claims of the patent, which is No. 1,052,270, involved in the suit, 8, 11, 12 and 13 read as follows:

"8. The combination of a demountable rim having radially disposed clencher flanges, a tire shoe having beads engaging said flanges, a wedge-shaped clamping plate bearing against said beads and adapted when moved to force said beads against said flanges, and means accessible from the inside of the rim for drawing the clamping plate radially toward the rim."

"11. The combination, with a wheel body, of a demountable rim therefor, a locking element, have a tapering portion, that is adapted to be moved radially and to thereby exert pressure against the rim outward radially of the wheel body, and to act as a wedge laterally, said locking element having an engagement with the wheel body whereby it may be moved radially of the wheel body."

"12. The combination with a wheel and its felly of a demountable rim therefor, a locking element having a tapering end that is adapted to be moved radially and to thereby act as a wedge laterally and exert pressure against said rim radially of the wheel, said locking element having a threaded engagement with the wheel structure whereby it may be moved radially of the wheel."

"13. The combination with a wheel body, of a demountable rim therefor, and a locking element, having a tapering por-

## Jean Porporato Wears An Italian Uniform



PARIS, France, Feb. 15—Jean Porporato, who brought the Sunbeam into second place at Chicago last year, and who is a well known figure on American race tracks, has had to obey the martial call and now is wearing the uniform of an Italian soldier. Although Porporato became mechanically interested in automobiles as soon as he left school, and has been race driver and tester for Minerva, Gregoire, Berliet, Sunbeam, F. R. P. and other firms, the military authorities have placed him in the ambulance corps, in which capacity he is now serving on the Italian front.

After nearly 18 months' service as a motor car driver on the French front, during which period he has had numerous miraculous escapes, Albert Guyot has just been transferred to the aviation section of the French army. Guyot learned to fly years ago, being one of the first men to mount a Bleriot monoplane, but nevertheless did not find it an easy matter to get a transfer from one branch of the army to another. He is now pilot of a Nieuport scout machine, capable of 120 miles an hour, his dangerous and exciting job being the bringing down of German machines which venture over the French lines.



tion, that is adapted to be moved to exert pressure against the rim outwardly radially of the wheel body, and to act as a wedge laterally, said locking element having an engagement with the wheel body."

#### Hasty Action Not Expected

Cleveland, Ohio, March 6.—General Manager J. C. Manternach of the Standard Welding Co., the only official of the company in the city at present, said he thought that Perlman would not bring an injunction suit to enforce the terms of the recent rim decision, without giving some notification of his intention to the company or its attorneys. The decision, he said, gave him the right to bring such a suit, if he so desires.

Regarding the payment of royalties on rims already manufactured under patents said to infringe on those held by Perlman, it is said that this will depend somewhat on negotiations with him, which indicates that the matter will be taken up in an effort to adjust the differences in some way.

Mr. Manternach did not care to indicate what course would be taken in the future, but indicated that some of the many patents held by the company might be used in place of those which have been adjudicated in favor of Perlman. This, however, will be a matter for future decision.

At the close of the Federal clerk's office Monday evening, no steps had been taken by the Perlman interests to bring an injunction suit against the company for the purpose of enforcing the payment of royalties, as had been threatened a few days before.

### Gives Arm to Country; Gets Medal and Glory

PARIS, Feb. 27.—Derelicts of modern warfare—warfare that saps the life as no other war ever has, daily return from the fields, many of them sans such wherewithal to earn a livelihood as arms and legs and eyes. Occasionally one is found who has a greater initiative than his fellow sufferers; one who, even though physically deficient by reason of bomb, sharpnel or bullet, turns his face toward a certain goal that promises a living. He is very sanguine, too.

At the right is seen an illustration of an erstwhile French soldier, the flotsam and jetsam of a new era in warfare, about to crank his Ford taxicab, which he drives on the streets of Paris. He has given his country an arm and received a military medal, plus glory, in exchange. Incidentally it may be said that he is more fortunate than many of the wrecks of men discharged from the ranks that hurl themselves against the Germans. The world understands the Frenchman's love for his native land, and naturally would not be surprised to hear him answer "*C'est bien*," or, translated, "It is well," if asked how he viewed his misfortune. It's a way the French have.

## Sparton Wins in Horn Design Suit

### Appellate Court Holds One Klaxon Patent Not Valid—Reverses Decision of Lower Tribunal

NEW YORK, March 4.—The Sparks-Withington Co., manufacturers of Sparton horns, won the last round in the horn patent battle which has been in the courts for a number of years. The latest development came in the form of a reversal of the decision of the United States district court for the southern district of New York, last week, in the suit the Lovell-McConnell Mfg. Co., maker of electric horns, against the Oriental Rubber Supply Co., a dealer in Sparton horns.

The circuit court of appeals for the second circuit has entered a decree holding that no infringement of the patent of the Lovell-McConnell Co. on its electric horn has been committed by the Oriental company, the patent being declared invalid. The patent involved is the Hutchison patent, No. 1,120,057, issued December 8, 1914, to Miller Reese Hutchison.

Technical points in the design of the article were taken into consideration, the circuit court holding that to devise a combination of two mechanical ideas, neither involving invention, and unpatentable when taken separately, is not sufficient to justify the court in regarding the procedure as invention and the article therefore patentable. It was pointed out that the patent in suit contemplates no new function and accomplishes no new result. It covers a construction having the

drive shaft forming the axis of the electric motor at right angles to the plane of the diaphragm and slightly below the center. A face cam rather than a rim cam is used to vibrate the button at the center of the diaphragm.

This is the thirteenth case of this sort won by the Sparton signal.

#### SUIT ON SPECIAL FORD HOODS

New York, March 7.—Suit has been filed in the United States district court, this city, against the Universal Specialty Mfg. Co., Cleveland, Ohio, by D. McRa Livingston of this city, for alleged infringement of patents covering a streamline mask for radiator and motor for Fords and other cars. The patents involved are 1,156,017, granted Oct. 5, 1915; 47,162, granted March 30, 1915; 47,854, granted Sept. 21, 1915, and 48,323, granted Dec. 21, 1915. A petition for an injunction restraining the Low Motor Supply Co. from selling these radiators has been filed. The Ospeco Mfg. Co., Detroit, has already taken out licenses under these patents.

#### NEW PRESIDENT FOR PYRENE CO.

New York, March 5.—C. Louis Allen, advertising manager of the Pyrene Mfg. Co., has been elected president of the company. He entered the service of the firm 2 years ago and for a time was sales manager. He succeeds Darwin R. James Jr., the retiring president.

#### R. H. HARGER GOES TO SAXON

Detroit, Mich., March 5.—R. H. Harger has joined the forces of the Saxon Motor Car Co. at Detroit as advertising manager, following the resignation of E. W. Corman from that office. Mr. Harger was formerly advertising manager for the Markham Air Rifle Co.

#### SCHWARTZKOPF TAKES AGENCY

Detroit, Mich., March 5.—E. E. Schwartzkopf, Detroit representative for the Longemare carburetor, has been made sales manager for the Sunderman Safety Carburetor Corp. of New York and will open headquarters here. The Sunderman carburetor is known commonly as the mouse trap.

#### SPARTON CAPITAL INCREASED

Detroit, Mich., March 7.—Special telegram—The capital stock of the Sparks-Withington Co., Jackson, manufacturer of the Sparton horns and other products, has been increased from \$300,000 to \$1,000,000. The plant is to be doubled, giving employment to 300 more men. The working force at the present time totals 475. The present officers were re-elected.



# Pullen, Mercer Pilot, Victor in Ascot 100-Mile Race

Burman in Peugeot, Second, and Cooper in Stutz, Third, at Opening of Season

By Al. G. Waddell

Struggle of Inches for 95 Miles Watched by 40,000 Spectators Who Wax Enthusiastic

ASCOT PARK, Los Angeles, Mar. 5.

—Special telegram— America's racing season of 1916 was opened today, when out of a field of fourteen speed specialists, who were said to be the classiest group that ever faced a starter's flag in the West, Eddie Pullen, driving his famous old Mercedes No. 4, captured the George Washington sweepstakes on the Ascot speedway this afternoon. After making three stops for tire changes, leading off many laps and, in turn, being led by Earl Cooper, who fought close with a Stutz, with only a few inches or a few feet between them throughout 95 miles of the 100-mile dash, Pullen gained the lead when Cooper was forced to stop for the fourth time and the red Mercer flashed across the line, winner of the first important 1916 speed battle. Pullen drove the same car with which he won the Corona classic a year ago Thanksgiving day. It is his second winning on the Pacific coast in 3 months, having finished first in the 100-mile contest in Los Angeles Christmas week.

Notwithstanding the three stops Pullen was obliged to make and the tire-eating condition of the newly-surfaced speedway, he averaged 66.88 miles per hour for the hundred miles.

## Burman and Cooper Close

Bob Burman, driving a French Peugeot, finished second with an average of 66.1 miles per hour. Cooper, having come up again after making his fourth stop, finished not 10 yards behind Burman.

With the exception of the twentieth mile, the pace set by Pullen and Cooper broke every record of the Providence 100-mile race of last fall, for the first 80 miles. Pullen was almost 3 minutes ahead of the Providence record at the end of the fiftieth mile. His time at this point was 43:04:2.5. If he had continued the same pace to the end he might have broken the record for the whole distance, but he slowed down after seeing that Pullen could not push him at the finish.

Dave Lewis, in Ruckstell's big Mercer, got away with fourth money, while Eddie



Eddie Pullen, winner of Ascot speedway race, a popular hero

a crowd of 15,000 or 20,000, and when 40,000 paid admissions had been counted up at the gates, the police could not handle the crowd. Every seat in the grandstand was sold an hour before the time of starting. The infield was black with motor cars and the old paddock shed, which has not been used since the days of horse racing in California, when at Ascot park thousands of dollars were lost and won hourly every afternoon, today seated 3,000 racing fans who possessed ability

along the lines of porch-climbing.

The Western contest board representative held up the race for more than 30 minutes on account of the thousands of spectators who had crowded up against the outside rails on both turns. It required that length of time for 100 uniformed police officers, twenty-five of them mounted, to clear the outside rails and herd the throngs into the infield. A squad of officers was sent up on the roof of the paddock shed to get the crowd off the roof, as it was considered dangerous, but as fast as they were chased off the 50-foot structure, they climbed back on the other side.

## Rain Threatens Another Postponement

Los Angeles was simply race-mad. The great meet had been postponed twice, and at 7 o'clock in the morning rain threatened to cause another postponement. After an hour the sky cleared. Though thousands from the suburban cities remained away, thinking that the race would not be held, the attendance was the largest ever known at a similar event in southern California. So much attention has been devoted to the rebuilding of the track, getting it ready for the dedication today, that adequate grandstands have not been provided, though it was believed the seating capacity already provided would accommodate the crowd. Now that the course is complete there will be additional grandstands built. The infield is to be elevated, allowing those in parked cars a view of the entire course.

David G. Joyee, chairman of the touring board of the A. A. A., was a guest

## HOW THEY FINISHED

Car and driver	Time	M.P.H.
Mercedes, Pullen	1:30:42	68.18
Peugeot, Burman	1:31:43	65.41
Stutz, Cooper	1:31:44.2	65.40
Mercer, Lewis	1:33:21.8	64.24
Duesenberg, O'Donnell	1:33:51.6	63.94
Running when flagged—Stutz, Parsons; Milac, Tetzlaff; Gordon Special, Elliott.		

## OUT OF RACE

Car and driver	No. laps	Cause
Marmon, Taylor	27	magneto
Tahals, Shockley	26	carbureter
Sunbeam, Hughes	94	tires
Romano, Lentz	6	leaking tank
Cyclone, Hill	34	broken tie rod
Apperson, Price	23	broken oil line

## STOPS OF WINNERS

Pullen, 44, 56, 82 laps	tires
Burman, 33, 63 laps	tires
Cooper, 40, 61, 77, 95 laps	tires
Lewis, 1, 51, 56, 89	
O'Donnell	no stops

O'Donnell, who entered a Duesenberg, finished fifth. O'Donnell and Frank Elliott, who drove a Gordon Special, were the only drivers to cover the distance without a stop.

As the fifth car crossed the line, the field was flagged down, preventing what might have been a fatal accident. The enthusiasm of the spectators grew until the crowd could no longer be controlled. The police and special deputies fought with them from the time the first car finished until O'Donnell crossed the line. Then it became impossible to hold back the clamoring crowd of 40,000 persons. In packs of thousands, they crossed the course and they poured over the fence from the infield, and, with Eddie Pullen on their shoulders, they paraded him around the course like a college football hero.

The speedway officials had anticipated



of honor, as was Ralph W. Smith, vice-president of the association. Arthur M. Jones of Chicago, occupied a box with Caleb Bragg, and Glen Martin was in a box at their left.

Despite the great crowd, it was the best-managed race ever conducted in California. Everything from brake tests to the finish of the fifth car, including trials for course record, was run off like military maneuver. The rules, always heretofore more or less overlooked in this state, a fact which roused Chairman Kennerdell to quick action at the time of his visit to the coast last spring, were enforced to the letter. Even the details of the surgical staff were carefully worked out. With five physicians, two ambulances, and reservations in three hospitals, the management succeeded in getting through the day without an accident on the course.

#### Accident in Practice

The day before the race, Omar Toft, driver of the Omar, turned over in practice and both he and his mechanic, Kincaid, were badly injured. Toft will be out in a week, but Kincaid sustained a compound fracture of the left leg and is in much the same condition as Bert Dingley was 2 years ago at Tacoma.

The mishap occurred when the Omar blew a tire on the bank coming out of the first turn. The car skidded down and through the rail into the safety zone. After getting the car righted, Kincaid reached over and pulled the wheel to the right, throwing the car back on the paved speedway, where it turned over, end for end, wrecking it to the extent of broken wheels, radiator and pump.

There were fifteen entrants in the list of drivers, but only fourteen started. R. C. Durant, entrant and driver of the Durant Special, notified the management after the second postponement that he was compelled to withdraw and leave for the East on business.

The cars were started four abreast, the pole car setting the pace, coming to the line with a rolling start at a speed of 30 miles per hour.

Very few stops were made and those that were made were mostly for tires. The asphalt-concrete course is easy on casings.

## Harroun Builds Twelve

### Former Speedway Champion to Campaign New Aviation Motor in Racer

#### Has Purchased Maxwell 450 Cars and Equipment

CHICAGO, March 4.—Ray Harroun, one-time international speedway champion, has become the owner of the three big Maxwells which have been campaigned for two seasons. These are the predecessors of the smaller Maxwell racing cars now in Indianapolis. Along with the cars themselves, Harroun has acquired the tools, jigs, patterns and so on, which will be used in manufacturing his aviation motor.

First of the aviation motors, according to Harroun's plans, is a 250-horsepower engine of twelve cylinders and will make its first appearance in the racing car Harroun is building. In a letter to Motor Age, Harroun says:

"I have purchased all of the Maxwell race car equipment, including drawings, tools, jigs, patterns, and all spare parts on hand, also the three 450-cubic-inch racing cars.

It is my intention to apply this tool

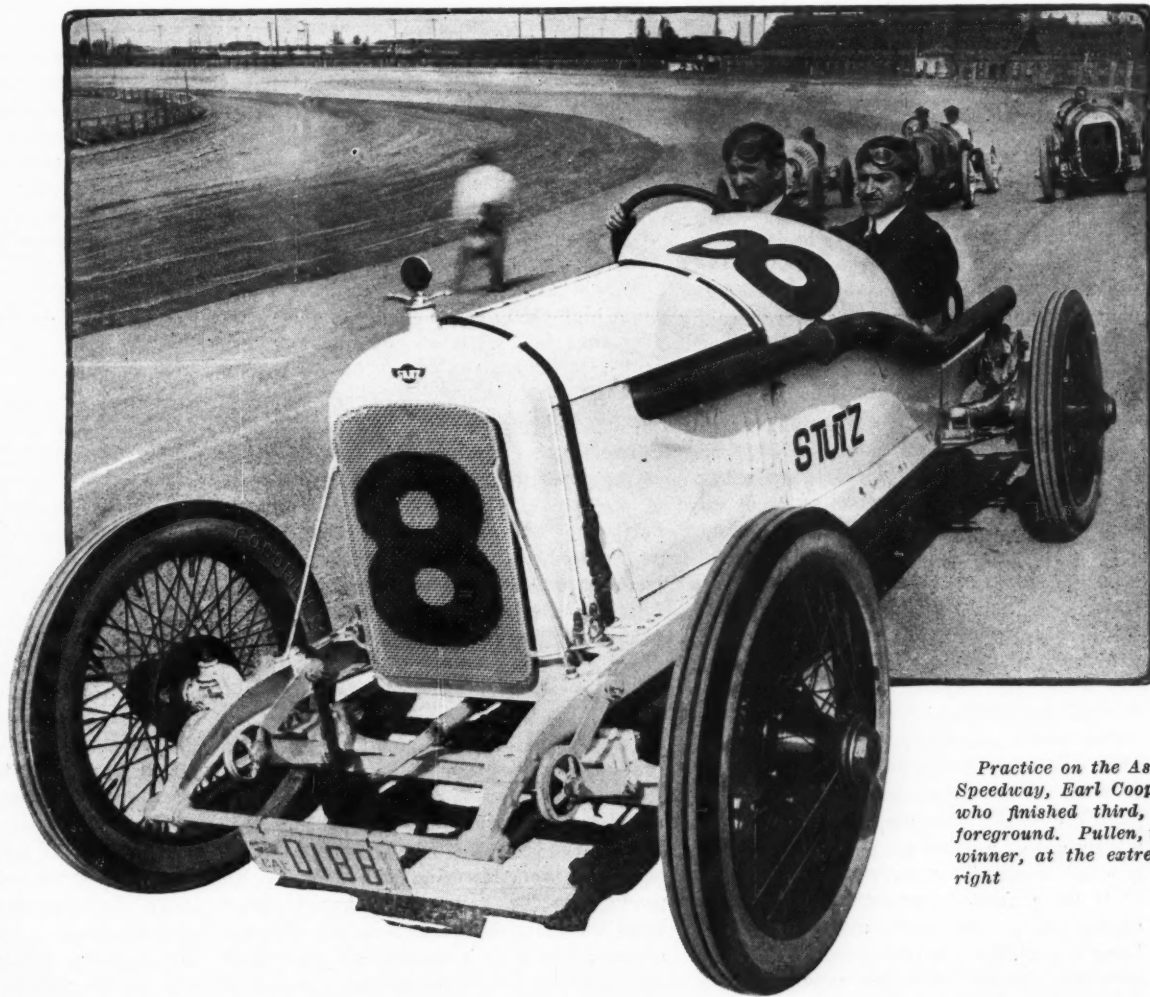
equipment, patterns, etc., to the manufacturing of my aviation motor which will be largely along the lines of the racing-car motors, with the exception that they will be of the twelve-cylinder variety. The first one will be 250-horsepower, which is the one I will try out on the free-for-all racing car which I am building.

"I will sell the 450 cars just as soon as I can find customers for the same—these have been recently overhauled and are now in first class shape. Two of these cars are the ones Moross raced last season and are outlaw cars. I have applied to the contest board of the A. A. A. for a re-instatement of these cars, basing my request upon the fact that cars were, at that time, racing under a lease agreement and were beyond our control. The other car, of course, is the one the late Billy Carlson raced at Tacoma last July 4.

"I am negotiating with parties in California for the purchase of two of these cars and it is quite possible they will be seen at the Corona race."

#### NEW SPEEDWAY IN OHIO

Cincinnati, O., March 4.—Plans for the motor speedway at Cincinnati have progressed to such a point that bids for the plant have been asked for by Hake and Kuck, the architects. Plans call for 2½ miles circuit at the Dayton and Springfield pike and the Crescentville Road.



Practice on the Ascot Speedway, Earl Cooper, who finished third, in foreground. Pullen, the winner, at the extreme right

# Conservation a Remedy for High Price of Gasoline

## Motoring Public Said To Wield Strong Influence in Crisis Facing Oil Producers

By Ralph E. Duncan

**A**MONG the prophets who have ventured to forecast the future of the gasoline market are some who believe that the motoring public must become an arbiter in a situation that is getting beyond the control of private industrial forces. From the offices of several oil companies a cry has gone forth for a Gifford Pinchot who will do for the oil industry what has been accomplished in the conservation of our timber resources.

The rise of gasoline prices has brought a crisis in the affairs of several of the companies in the roster of independents. They are facing ruin. The flame of the old feud between them and the Standard Oil interests burns higher, and every cent that is added to the price of gasoline aggravates the difficulty. It is those who are being pinched the hardest who come with an appeal to the motorists of the country. They urge the necessity of a public policy which will act to conserve the supply of crude oil and protect motor car users from excessive gasoline prices in the future. Plans are afoot to renew the effort to pass legislation which will allow federal regulation of oil production, by the method proposed in 1913 by Secretary of the Interior Franklin K. Lane.

### Appeal to Motorists

Motorists, dealers and manufacturers of motor cars are scarcely aware of the power that might be exerted by their combined influence. Men in the oil business, however, who are looking about just now for a life-belt of some sort, have recognized the vital interest which the motoring public has in the problem of gasoline supply. They see, too, that more crude oil is required for the manufacture of gasoline than scientific methods make necessary.

The patented process of refining, known as the Burton process, controlled by the Standard Oil interests, extracts from two to three times as much gasoline from the oil as other refineries obtain. This is one source of waste. Too many wells in the same vicinity, a condition which arises when there is no regulation exercised in the drilling and production, constitutes another great source of loss by draining the fields too rapidly and reducing the flow of the wells, the experts declare.

In demanding that Congress adopt a plan of conservation to end the exploitation of the country's oil fields, the companies desiring this step are not acting wholly out of a spirit of generosity toward gasoline users. They have a selfish motive. If it were possible to obtain government regulation of oil lands under Secretary Lane's plan, just as the government now exercises control over the pipe-line com-

panies as common carriers, the independent producers would be placed on an equal footing with the Standard Oil organizations, so far as production is concerned.

If at the same time the patents controlled by the Standard Oil Co. were to be released to the public, the greatest handicap of the independent refineries would be removed. Litigation to force such a step is possible, but in years gone by none of the independent companies has shown an inclination to take the initial steps in the fight. Competitors of the Standard Oil Co. assert that the patent on the Burton process is invalid because based on improvements to other patents which have expired.

Whatever the merits of the claim, conditions compel the independent refineries to use 200 barrels of crude oil to produce forty gallons of gasoline, while the Standard Oil refineries would obtain the same amount of gasoline from 100 gallons of the same quantity of crude oil. The burning oil and fuel oil, which are the other products of the still, must be disposed of also, though both are produced in quantities exceeding the normal demand.

Thus, while gasoline sells at high prices and is scarce, the burning oil and fuel oil are over-plentiful and sell at low prices. Any profit realized on the crude oil must be derived from the gasoline, which is one of the important factors in raising prices. Little or no profit can be obtained from the sale of fuel oils that are produced from high-grade crude. This is due to the fact that fuel oil must be sold at a price which is equivalent to, or less than, the cost of coal that would yield the same energy in heat units.

The Burton process is commonly known as the pressure-still process and the method is known as "cracking," the heavier portion of the oil being run into a still and placed under pressure. The government appropriated a sum for experimenting with methods of refining crude oil 3 years ago, and as a result the Rittman process has been worked out and placed at the disposal of all refineries. An independent jobber makes this comment:

"One-third of the amount of crude oil that now is used would supply the market for all requirements if all the heavy ends were run through pressure stills. This would have the effect of reducing the price of crude and lowering the cost of all products. The government has made a step in the right direction in the Rittman process, but it is a failure, all reports to the contrary notwithstanding. Even if

the method were practical it has not been developed to the point where it can be used. No refineries are using it and none will under the conditions laid down by the government, which requires parties using the process to bear all the expense of developing with no means of reimbursing themselves, and they must also give the result of their discoveries to others. This is all right in one way, but it has the effect of making every one hold off, waiting for some one else to stand the expense of trying out the method."

### Want Privilege Extended

He declares also that the Burton process is the only practical method and insists that the government "should either knock out the patent in the interest of conservation, or compel the Standard Oil Co. to allow others to use it.

Pipe-line transportation is another phase of the problem. It has not so much to do with the question of conservation as establishing uniform charges and equal privileges among all producers. The variation in prices of gasoline in different localities is largely the result of a difference in transportation cost, depending on the distance from the oil fields to the refineries. In the light of the effort to force a policy of conservation by an appeal to public opinion, the following excerpt from a report of the Federal Trade Commission on pipe-line transportation of petroleum is of interest to the motor car owners who pay the bills:

The oil-producing territory in Kansas and northeastern Oklahoma alone covers an area of about 175 miles from north to south and 75 miles from east to west, and includes more than 150 producing pools, and new pools are being opened up every year. Although particular wells, and even particular pools, are often quickly exhausted, experience has shown that this is not true of a large oil field as a whole. A number of large oil fields have been developed in the United States and in foreign countries and most of these fields have either been operated with a large production for several decades, or apparently have not yet reached their maximum production. While some of them are not producing the maximum quantity at the present time, all of them are still large producers. Furthermore, it is evident that the large pipe-line companies in the Mid-Continent field anticipate a large production over a considerable period of time, because the average depreciation charge which they make against their gross investment is less than 5 per cent per annum.

The plan of a national conservation program rises out of a great confusion of ideas, theories and rumors. From one quarter it is asserted that the railroads have been adroitly reduced to a state of subservience by the Rockefeller interests. Perhaps the rumor which will rouse the most partisanship among motorists and other users of gasoline is one which says that a certain unnamed senator is to oppose Theodore Roosevelt as candidate for president on a platform which makes an issue of the relation of the Standard Oil Co. to the public.



## Champion Kerosene Use

### Colorado Oil Inspector Campaigns Substitution for Gasoline

#### Would Educate Users of Internal Combustion Engines to That End

DENVER, Colo., March 2—A campaign to encourage the substituting of kerosene for use in combustion engines has been started by Colorado State Oil Inspector James Duce, assisted by Prof. John A. Hunter, instructor of mechanical engineering in the University of Colorado. After extensive experiments, their first public step toward educating motor car owners and other users of gasoline engines was made yesterday, a meeting being held at the state house for a general discussion of the fuel problem and the technical points involved in using kerosene. The meeting was attended by representatives of the Automobile Trades Association of Colorado and the Denver Motor Club, by tractor and oil men, and a goodly number of individual motor car and tractor users.

#### Margin of Saving

It was shown that tractor motors built originally for kerosene usage develop as much power from a gallon of kerosene costing 12 cents as can be produced by a gasoline tractor from a gallon of gasoline costing 23 cents, while slight mechanical changes will enable a standard gasoline motor for motor cars to develop equal power from about one-fourth more kerosene than gasoline, making the cost-ratio for practically the same power in motor cars 16 cents for kerosene as against the present Denver price of 23 cents for gasoline. It was urged that the added difficulty of handling kerosene motors could easily be overcome by careful study of required methods, aided by engineering improvements. The question of the more unpleasant odor from kerosene can be met, it is thought, by practical education against established prejudice along this line.

Inspector Duce's records show that Colorado consumed about 15,000,000 gallons of gasoline during 1915, a gain of 45 per cent over the previous year. He argues that the most practical way to check the alarming advance in the price of gasoline is to substitute kerosene, which he said has become a by-product of the oil refineries, particularly those operated by independent concerns.

The present price of 23 cents, which is the highest on record for Denver in 15 years or more, has been reached by a rapid series of 1-cent jumps, beginning 10 months ago at 12 cents, which was the lowest price recorded here in 20 years.

Professor Hunter and other engineers at the state university at Boulder, where gasoline is now 28 cents, are experimenting along all lines of mechanical developments

required to insure the success of using kerosene as a motor fuel. They declare themselves ready to furnish practical information and suggestions to all inquirers as an aid to Inspector Duce's state-wide campaign for kerosene tracting and motoring.

#### DU PONT GASOLINE SUBSTITUTE?

Wilmington, Del., March 6—While it is understood that some local interest is affiliated with a movement the object of which is to develop, if possible, some cheap substitute for gasoline as a generator of power for motor cars, the du Ponts, large powder manufacturers, say there is no truth in a report current here to the effect that they are interested. The du Ponts have branched out along many lines, utilizing by-products in many ways and to good commercial purpose, and it was reported that they were back of the gasoline substitute movement, but as a company they are not, though it is still believed that some of the du Pont interests, individually, are connected with the project. However, it has been impossible to learn just what the facts are or who is back of the enterprise.

The du Ponts, in addition to being heavily interested as motor car owners, are also interested as individuals in some of the big motor manufacturing companies, but it has not developed that any of them are interested directly in oil.

#### CRUDE PRICES SEND GASOLINE UP

Chicago, March 7—Following an announcement by the Prairie Oil & Gas Co., at Tulsa, Okla., that an increase of 10 cents per barrel in the price of crude oil from Oklahoma and Kansas, would take effect this week, another raise of 1 cent in the wholesale price of gasoline was made today in Chicago, and word comes from over the country that similar increases are being made in other cities.

Gasoline has been selling at 22 cents retail in Chicago's down-town garages and filling stations, and at 21 or 21½ cents at some of the out-lying stations. At least 1 cent will be added to the price today, for the new wholesale prices became effective this morning. The Standard Oil Co. sets a retail price of 2 cents higher than the wholesale figure, which now will be respectively 19½ cents and 21½ cents.

#### Pay 32 Cents in New York

Motorists in New York City are paying from 26 to 32 cents. During the week the wholesale price advanced from 23 to 24 cents. Consumers were paying from 14 to 17 cents at this time last year. Despite the activities of the investigating bodies of the government and the protests of local trades associations, prices since that time have gone up at the rate of about 1 cent per month.

At Phoenix, Ariz., the wholesale price has jumped another cent and is now 22½ cents. It is rumored that a further rise will follow in a few days. Retailers are charging all the way from the wholesale figure up to 25 cents.

## Fuel 45 Cents a Gallon

### London Motorists Now Pay That Figure — Paris Price High

#### For First Time in Motordom French Cost Less Than English

PARIS, Feb. 15—Gasoline has taken another leap in both France and England. In London district it is now selling retail at 45 cents per American gallon. This is the highest price in the history of England, and the highest price in European countries, Germany excepted. The direct result of this increase has been a curtailment of motoring; the use of cars for any other than utilitarian purposes is very small indeed.

As, however, the use of motor cars in Great Britain for business and professional purposes is very extensive, the high cost of gasoline has called forth loud-voiced protests. Before the war, and before the government put a tax on gasoline, it was selling in England at about 20 cents per gallon; thus the price has more than doubled in a period of 3 years.

There is considerable resentment against the few companies controlling the gasoline situation in England, motorists considering that the increased selling price is altogether out of proportion to the increase in freight and insurance. There is no doubt that when normal conditions are again established there will be a very strong feeling in favor of the use of benzol in place of gasoline.

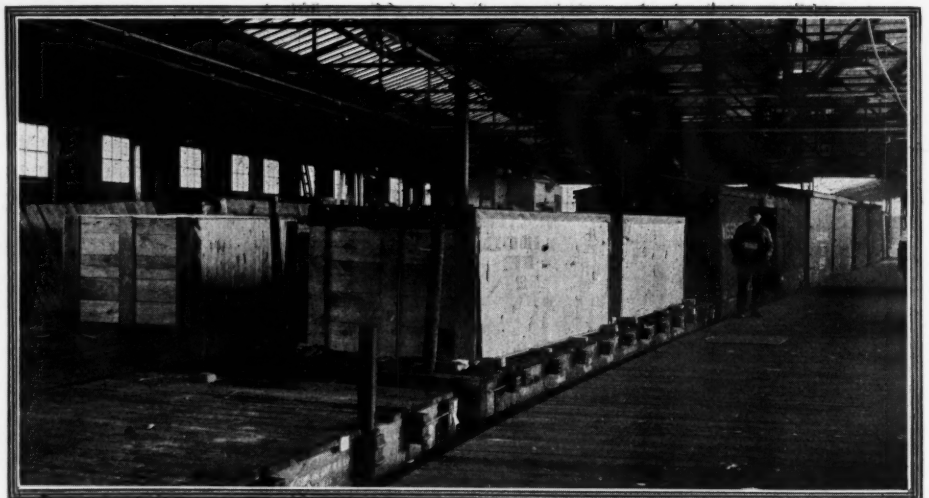
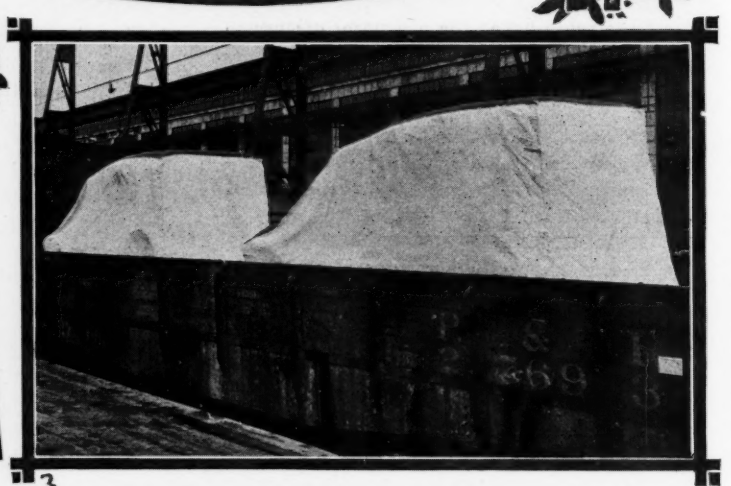
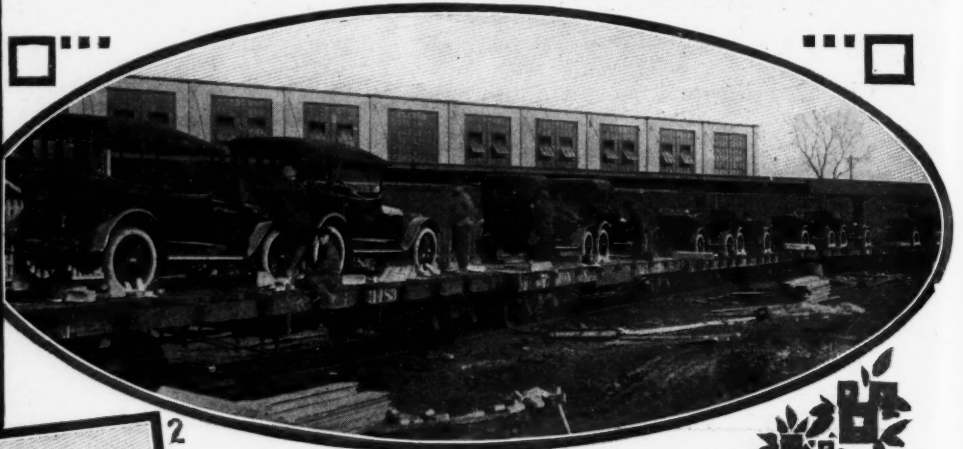
#### French Price Up

France has also had to stand for a rise in the price of gasoline, the refiners recently have decided to put \$1 per hundred litres on gasoline and 60 cents on kerosene. The retail price averages 42.5 to 44 cents per American gallon. This excludes the city of Paris, where there is a special local tax artificially increasing the price of gasoline. For the first time in the history of motordom, gasoline is cheaper in France than it is in England. This is partly explained by the fact that in England a government tax has been placed on gasoline, while in France the tax has undergone no change.

The situation in France is considered so serious that a sub-commission of the ministry of commerce has been entrusted with an inquiry. This commission met the refiners before the present rise went into effect and was able to arrange that the price of kerosene should only be increased 3 francs instead of 5 francs per 100 litres. The projected increase in the wholesale price of gasoline was carried through, however, with a provision that in case the retailers' increase was disproportionate to the wholesale increase the refiners would undertake to sell to any municipal authorities at wholesale rates.

# Making the Most of Poor Shipping

## How Detroit Manufacturers Are Obligated to



1—This van mounted on a 3½-ton, worm-driven chassis, was too big to be shipped in a box car, so the Federal Motor Truck Co. loaded it on a flat car

2—Shipment of Chalmers cars being blocked for safe travel

3—Paige cars in a gondola ready for shipment. Note the canvas covering. Under this there is other protection from the elements

4—Shipping a Federal truck by express

5—Cadillac cars being loaded for shipment to New Zealand

**S**HORTAGE of freight cars designed especially for handling motor car shipments has made it necessary for manufacturers to use whatever cars the railroads are able to furnish. If they would get their daily production off to the clamoring dealers. This means that a large number of flat cars and gondolas, especially in Detroit, where railroads always have been hard-pressed to furnish sufficient cars to handle the daily production.

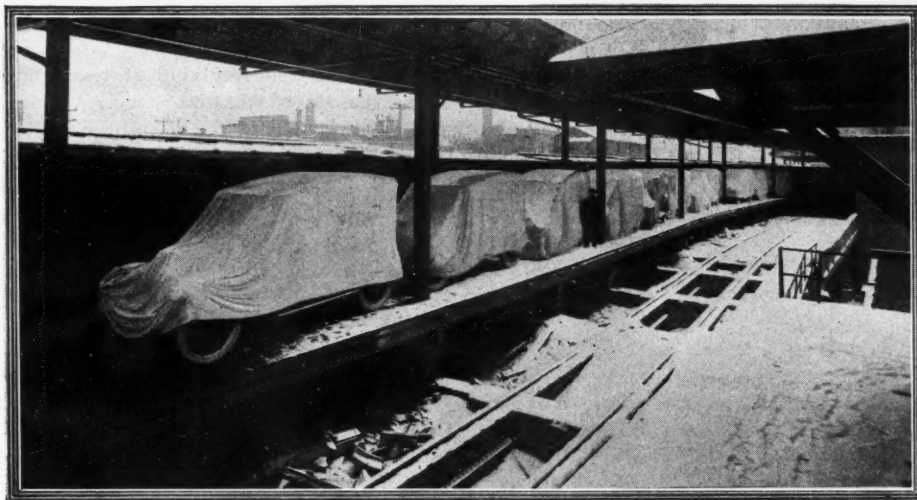
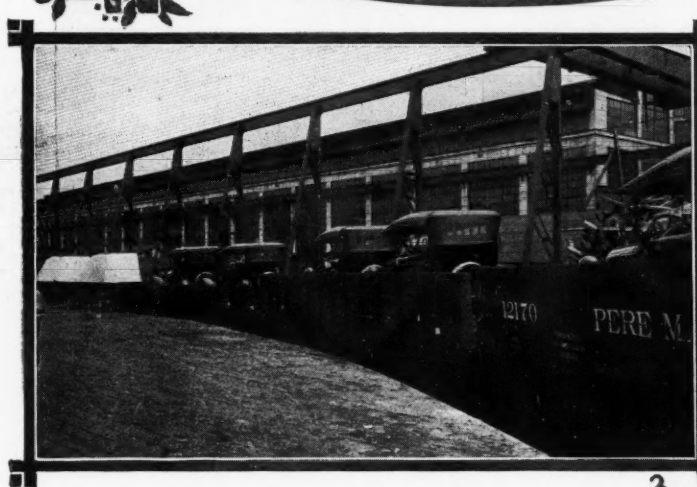
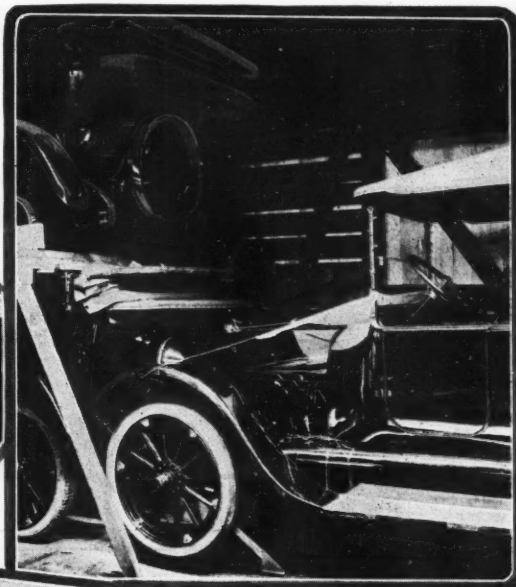
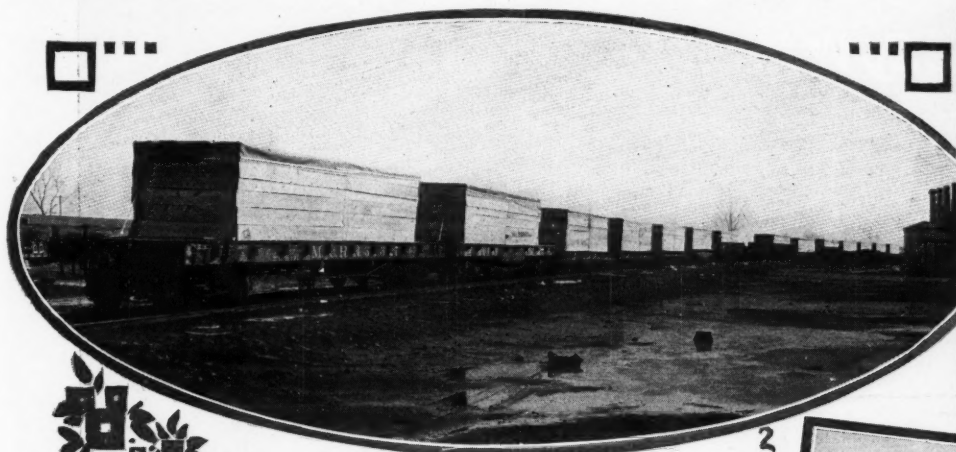
On this and the following page is shown some photographic views of the methods employed in shipping motor vehicles on open cars. These illustrations give a graphic idea of the situation in Detroit, where all the concerns referred to in the illus-

trations are located. Gondolas are used by the Packard company for transporting trucks, two of which are shipped on each car. They are inclosed in a special wooden housing, which the dealers return to the Packard company for use in future shipments. These housings or casings are billed as a carload of lumber, car, paper, etc. Some of the car manufacturers are even going so far as to ship their product by express instead of by freight, owing to the fact that the railroads are not able to promise prompt delivery by freight route.

It will be noted in one of the illustrations that a number of the cases covering the cars are marked with foreign addresses.



# Facilities at the Michigan Metropolis Make Shipments of Cars to the Waiting World



1—Showing how Studebaker ships its cars five in one freight car. This is more than most makers ship in one car

2—Part of a trainload of Chalmers that are traveling in the open to waiting dealers

3—Paige cars just put in gondolas. Before ready for their journey they are covered like those in the extreme left of the illustration

4—Packard trucks are shipped two to a gondola

5—Cadillacs awaiting the coming of cars. Even with the improvised shipping facilities, cars are none too plentiful and waiting often is in order

This is quite a common method for shipping motor trucks and cars abroad. The illustration shown is of a part of an export order which the Cadillac company sent to the Pacific Coast and thence by steamer to New Zealand.

The Studebaker company as well as the Dodge in some cases ships five vehicles in a freight car, instead of only three or four, as is done by most of the other manufacturers. One of the illustrations shows how this is done. Two cars go into each end of the freight car and the fifth with its top up goes into the middle of the car.

One of the largest shipments of vehicles on flat and gondola

cars thus far made from Detroit was that of a train of 56 to Philadelphia, made by the Chalmers Motor Co. The process of loading this trainload is shown in the illustrations. The vehicles first were taken to the freight cars, then fastened to prevent moving about in the cars and covered with cloth for protection, after which they are inclosed in a wooden superstructure and finally, after the boxing process, they are covered with tarpaulin.

It is said that one reason for the car shortage is due to the fact that nearly 100,000 freight cars are tied up between Buffalo and New York City, due to the inability of sea-going freighters to handle the business at the terminals.

# Hairsprings for Car Cushions

By W. K. Gibbs



Above is a view of the fanning machines that remove foreign substances from the hair that did not come out with washing and at the left is the sorting and grading department

road and car, before they get to your spinal column, you are put to a great deal of annoyance and discomfort.

The same curiosity that prompts a boy to investigate what is contained within the case of his first watch does, or should, overtake us when we are giving the acid test of observation to car buying. Naturally the prospective buyer wants to know all the

mechanical details; he wants a car that will compare favorably with those of his friends when it comes to speed and appearance, but he should not lose sight of the fact that motoring comfort comes in on a fifty-fifty basis with upholstery, and by that I do not mean in appearance, but in actual results. Taking upholstery at its face value may be productive of such results as would please the most fastidious in some cases, but it does not follow that an apparently good piece of leather or fabric covers an equally good filler. Either may, to use an old maxim, "cover a multitude of sins."

It was for the purpose of giving such information regarding the material used in a major percentage of present-day motor car cushions, as would acquaint readers

with the production of that part of the upholstery under the surface, that a visit was made to the curled hair department of Sulzberger & Sons Co., at the Chicago stock yards. The process involved in sterilizing and preparing hair for upholstery purposes proves very interesting.

## An Odoriferous Station

We visited the receiving station first. Here the raw material from various sources throughout the country is unloaded from the cars. It is not well to linger long at this point for the "un" from the unbiased mind might easily be removed and prejudice against any commercial use of hair arise. I cannot describe the odor since I lack superlatives of sufficient strength. However, this antagonistic feeling rapidly is offset as one follows the various steps in the several processes by which the hair is sterilized.

From the unloading platforms we went to the laundry; one that specializes in rough-dry work. Here the sterilizing begins. In great vats filled with constantly-changing heated water the material is placed and rapidly-revolving drums wash and scour the major part of the blood, dirt and foreign matter from the hair. Then the "wash" is artificially dried by fans and then sun dried in the open air, after which it is washed again and taken to the barber shop for clipping, sorting and grading.

In this department I found what I consider the zero in occupations—barbering cows' and horses' tails. I never did like

SINCE motordom has come to that stage in its evolution where it is making a universal demand for comfort, and since inequalities in the road's surface are comfort's worst enemies in motoring, it follows that a car is not more comfortable than its upholstery. As long as motor cars travel on roads and not on theoretically smooth tracks, jolts will be stumbling blocks in the way of comfort.

Because of this, and to overcome it as much as possible, there are pneumatic tires, springs and shock absorbers, all of which tend to save and preserve the mechanism of the car, but you cannot sink down into any one of them and relax. For this reason you require upholstery. This part of the car is for comfort alone and unless it is resilient and absorbs the shocks from



lady barbers, for reasons best left unsaid, but here I found a new variety, although I cannot say my previously-formed impressions have changed. Here women sit all day and clip the hair from the stumps of tails and in their profession they are expert. They understand how to cut so as to give the most hair of the greatest length. As they clip they sort as to color, after which the hair is hand-picked and graded as to length and quality.

When the grading and sorting has been finished the hair is sterilized again, and artificially and sun dried. Then it is baled and taken to another room where it passes through a series of machines that are not so very unlike fanning-mills with which the farmer cleans his grain of the chaff and foreign matter. The hair is fed into these machines, the base of which receives the foreign substances not removed in washing and sterilizing, this being blown out of the hair by high-speed electrically-operated fans. In this air cleansing the hair passes through three such machines.

#### **"Putting the Hair in Curl Papers"**

After watching this step in the process we went into the curling department. Across one end of the room is a series of rapidly-driven spindles to which men carrying baskets of the hair coming directly from the machines mentioned in the preceding paragraph, attach a handful of the hair and, while walking backwards, spin ropes in just the same way that ordinary rope is made.

Two men work together, each spinning a rope about 100 feet long. When this point is reached the ends of the two ropes are joined, making an endless rope of about 200 feet. At intervals in the 100 feet from the revolving spindles are placed supports for keeping the rope from the

floor. These resemble telephone poles, with their cross-arms and insulator pegs holding up and separating the ropes. The movement of the spindles is controlled by ropes running the full length of the room and immediately over the head of the man working from the spindle. Pulls on this rope stops, starts and reverses the movement of the spindle.

All of the hair that drops to the floor during the spinning process is gathered up and goes back to the sterilizing room, to pass through all the processes previously mentioned before being returned to the curling, or rope-making room. When the ends of the 100-foot ropes have been joined, the doubled rope is further spun and then twisted together, until it shortens to about 50 feet, or 25 feet doubled.

Then these ropes pass through a sterilizing process again and are baled or skeined and put in storage where they remain at least 12 months in order that the curl may thoroughly set.

The skeins may remain in storage longer than a year. At any rate the hair remains in the skeins, baled, until needed to fill orders, when the skeins are taken to a department where the ends are put on spindles turning in the opposite directions to those which did the original twisting. This process unwinds the rope and leaves the hair in a condition like a woman's hair after the curling pins have been removed. Pull the rope and it stretches, but immediately the pull is released it springs back to its original form. In this room all the hair that drops to the floor likewise is re-



*Barbering cows' tails; a process that looks better than it listens*



*Illustrating how the curl is put in the hair. These ropes are tightly twisted and all the hair that falls to the floor goes back to the sterilizing room again, where it begins the trip back through all the steps again*

turned to the starting point and passes through each step of the process again.

Next the untwisted ropes are taken to the carding machines. These machines have a toothed roller that carries the hair forward to a series of combs. The first machine has single combs, perhaps a dozen traveling the same way as the hair but a little faster. The one on the farthest side of the bed from the incoming hair drops below the line of travel when it reaches a certain point and another comes up on the opposite end to take its place. After passing the combs the carded hair is wound on a drum, from which it goes to another similar carding machine, but with double and finer combs. The operator or attendant at each machine—the carders are automatic—watches the combed hair at the point between the combs and the drum and picks out any portions of the hair that still resembles rope; that is, those parts that did not get a thorough combing.

The combing process of the second and third machines is no different from the first, except that by the time the third carding is accomplished every hair has been combed out until it might be said there are no snarls. This is the last process except the baling. Forms for the bales are placed convenient to the last carding machine and these forms next are lined first with burlap and then with paper and when full the paper is folded over, the burlap sewed across the side and one end and lifted out of the form. The bale is placed on scales and enough added at the open end to bring the weight to 50 pounds. That quantity of curled hair makes a bulk about three times the size of a man.

#### Cleanliness a Watchword

Cleanliness is the watchword throughout the manufacturing process of curled hair in this plant. The finished product is odorless, fluffy and resilient. An ounce under compression might be covered with the two

hands, but released, it more nearly would fill a half-bushel basket.

Cotton has a tendency to mat, pack and sag; it takes up impurities, retains heat, because it lies too compactly, and in damp weather, or in humid climates, becomes mouldy and furnishes cause for rheumatic ailments. Hair sheds moisture readily and will fluff out and dry itself readily in a few hours.

The process that puts the curl into the hair and the length of time the hair ropes are left in skein make for the permanency of the curl. There are many grades of curled hair, just as there are many lengths and grades of springs. The long spring is more resilient than the short one; so it is with curled hair—the longer the hair and the better the quality, the more resiliency. The fact that the curl in the hair makes the hair the equivalent of a spring, substantiates the phrase, "hairsprings for car cushions."



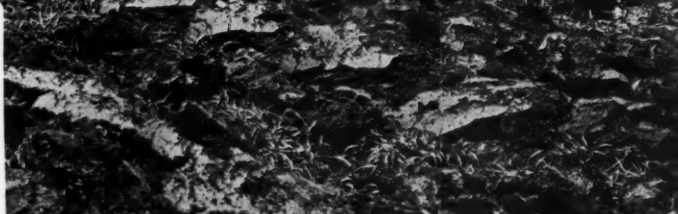
## Reclaiming of Farms with Motor Trucks

IN the recently drained areas of Louisiana, where the earth crust is too thin to support a steam tractor and where the going is so heavy that mules, though able to travel, cannot pull, the broad-tired truck is being used to plow and grade. Vast areas of these lands are being reclaimed by the big southern land companies. While under reclamation they are a paradise for duck hunters, but no place for a truck, to all appearances. However, appearances have been set at naught on the 130,000 acre estate of the Phillips Land Co., by the use of a White good roads truck to build roads and prepare the land for cultivation.

The truck was first used to make a road across the tract to the pumping station, which was done by cutting a shallow ditch at each side of the roadbed and grading it until there was a crowned surface and the highway had been built up enough to stand ordinary traffic. This was across land that had been under water only 90 days before and over which no other machine except a caterpillar had been able to pass.

A test of the truck, after the road had been built, was putting it into a field which had not been cultivated within the memory of the oldest inhabitant, where there has been no plowing for generations, and where the weeds stood waist-high. In this field the truck hauled a five-blade gang plow with the blades in to the limit, cutting furrows 8 to 10 inches deep.

Similar use was made of another truck of this type at Brunswick, Tenn., by the Bolton College Agricultural School. There the truck plowed 20 acres in 8 hours. In



White truck plowing on 130,000-acre tract of reclaimed land in Louisiana



White truck plowing in field near Northfield, O.

places the field was too wet to be plowed and the whole surface was heavy and miry. The truck extricated itself from mud-holes without assistance.



# Chevrolet Earnings for Last 4 Months of 1915, \$1,653,686

Statement Shows Gain of Nearly 28 Per Cent in Cash on Hand Since January 1, 1916

NEW YORK, March 7—Earnings of \$1,128,590 are reported by the Chevrolet Motor Co. for the 4 months ended Dec. 31, 1915, after deducting expenses. To this total was added \$525,096 from other sources, making the aggregate revenue \$1,653,686.

Cash on hand on Dec. 31 amounted to \$4,192,968 and the statement issued yesterday showed that this has been increased to \$5,377,079 by March 3, a gain of nearly 28 per cent in slightly more than 2 months.

W. C. Durant, president of the company, in his statement to the stockholders said: "While materials at the moment are difficult to obtain and prices are considerably higher in some instances, the reduction in overhead expenses due to increased volume of product enables us to show a reduction in cost as compared to the 4½ months covered by the report.

"Due to abnormal conditions, as a matter of protection, we are carrying extremely large inventories, fortifying ourselves to take care of contracts and orders representing a value in excess of \$26,000,000 now upon our books for delivery within the next 5 months. The operating profits of the Chevrolet companies for the year ended Dec. 31, 1916, should approximate \$6,000,000, to which will be added the income from other sources."

The Chevrolet Co. produced in 4½-month period 11,888 cars through its five plants in New York, Tarrytown and Flint. The Oshawa (Ont), and St. Louis plants, recently started, have turned out comparatively few cars, their output not being included in above figures. In February, President W. C. Durant announced that within the next 6 months the daily output of the company was to be doubled, at rate of 230 cars a day and stepped up monthly until the plants are producing 460 daily in August.

## OVERLAND REACHES 100,000 MARK

Toledo, Ohio, March 2—The 100,000 mark was reached by the Willys-Overland Co. last Monday with shipments to date more than treble those reached a year ago. Overland dealers now number nearly 5,000 in this country and Canada. Foreign dealers number about 500.

## HARADON HEADS N. Y. GARAGEMEN

New York, March 6—William M. Haradon, New York, was re-elected president of the United Garage Associations of New York, Inc., at the annual meeting and convention held in Albany, March 1 and 2. All other officers were re-elected, these including Vice-president John Vanbenschooten, Poughkeepsie, and Treasurer Edward W. Leahy, Albany. George F. Kaiser was

appointed secretary for a term of 3 years. Among other things the meeting adopted resolutions deprecating the action of the gasoline refiners in permitting a chaotic condition with regard to prices.

The association approved the passage of a lien law similar to that now in force in New Jersey and approved the introduction and passage of a fraud-on-garage-keepers measure. The date of the annual meeting was changed from the first Wednesday in March to the first Wednesday in January, during the New York show. A change was made. The place of the annual meeting from Albany to New York City. The by-laws were revised. The meeting made plain that the association soon will take an active interest and a prominent place in the affairs of the retail trade in New York state. Secretary Robert A. Wilson, of the National Automobile Trade Association, was present and explained the scope and objects of that body. S. P. McMinn and T. W. Snead, of Motor World, addressed the meetings.

## TO BUILD FERGUS IN U. S.

Albany, N. Y., March 3—The Fergus Motors of America, Inc., was incorporated today, to manufacture the Fergus car shown in this country for the first time at the recent New York show. The capital stock of the company is \$2,000,000 and the main offices are in East Chester, Westchester county. The directors of the company are C. T. B. Roew, of Bronxville; Charles Blandy Jr., New York, and F. F. Quantrell, Brooklyn.

## FISK REPORT SHOWS GAINS

Chicopee Falls, Mass., March 4—The annual report of the Fisk Rubber Co. for the year ended Dec. 31, 1915, shows net profits of \$1,791,579, as compared with \$942,204 in 1914. The report states that, in accordance with the first preferred stock provision, there were retired Dec. 31, 1915, out of the profits of the company, 3,750 shares of the first preferred stock, which, with the first preferred stock previously retired, represent the par value of \$600,000.

## REO STARTS APPRENTICE COURSE

Lansing, Mich., March 5—The Reo Motor Car Co. has started an apprenticeship course which will be extended over a period of 30 months, after which, it is expected that the apprentice will be a capable, all-around man suited for any work on any machine in any department of the machine shop division.

These apprenticeships will be open to American citizens only, of 18 to 20 years of age. First opportunity will be given to the men now working at the plant, then

sons of employees will be given a chance to enlist, and then, if necessary, outsiders.

An agreement will be made between the apprentices and the company for the period covering the course. During its duration the young men will receive 25 cents per hour, day work, and will also have an opportunity of earning more under certain exigencies.

## MAKERS ACCEPT TEXAS RULING

New York, March 4—The several car manufacturing companies recently sued in Texas for a violation of the anti-trust law of that state, on the ground that they limited the territory of the dealer, as is common practice throughout the country, have agreed to accept consent injunctions. These injunctions prohibit them from limiting their dealers to definite territory so that the manufacturers are changing their contracts with the dealers to comply with the law. In doing this, however, the manufacturers feel that the dealers as well as the general public will not profit by the change since a man may buy a car of a dealer several hundred miles from his home, but cannot expect that the local agent of the same car will give him service on a car bought from another dealer. This is only one example of the disadvantages of the new arrangement, the general tendency being to relieve the dealer of all responsibility as to service, etc.

## K. C. PLANS ROAD RACE

Kansas City, Mo., March 4—The American Automobile Association has been asked to sanction a 300-mile professional race here this summer over a 15-mile course through Grandview, Martin City, from the clubhouse of the Automobile Club of Kansas City at Hickman Mills. Officials of the club declare the course will be one of the finest that can be found in the United States.

## ICE RACE AT DULUTH

Duluth, Minn., March 6—Despite the blizzard front presented by the weather man yesterday, March 5, the second annual ice racing program was staged by the Duluth Automobile Dealers' Association before a large crowd. About 4,000 persons witnessed the races.

The main event of the afternoon, the twenty-mile contest, was won by Andy Bayliiss, driving a Mathewson. Ralph Hayman won the 10-mile in a Ford, while Ernie Nelson captured first prize in the 6-mile motor-sled contest.

A heavy wind retarded the speed of the machines on the 2-mile course laid out on Lake Superior. The average speed maintained was from 60 to 70 miles an hour.

# The Colorado Outlook

## Rocky Mountain State Dealers Find Beginning of 1916 Rolls Up Increase of from 30 to 500 Per Cent in Business

DENVER, Col., March 3—Colorado has done a winter business in motor cars averaging about double that of a year ago. Calculated on the basis of the last 3 months, sales increases ranging from 30 to 250 and even as high as 500 per cent over last winter are reported by established dealers, while a doubling or trebling of business is shown in many cases. Naturally, this gratifying growth in sales is most pronounced in the eastern half of Colorado, where moderate snowfall and generally pleasant weather have encouraged winter motoring and winter buying.

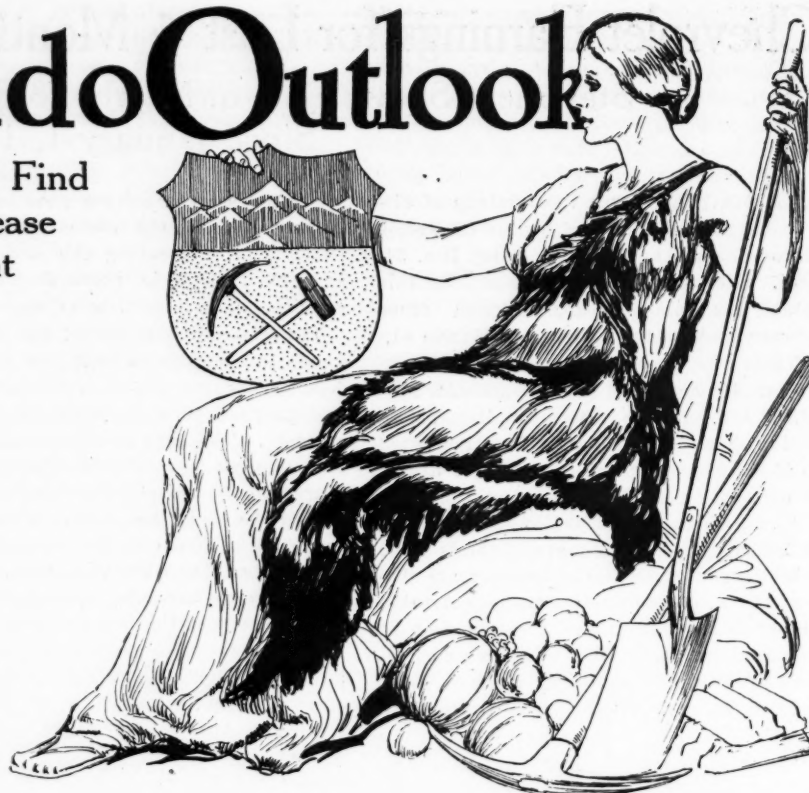
But the attractive prospects for 1916 are in evidence throughout the state, and also in Wyoming, Utah, New Mexico and other Rocky Mountain territory supplied by Denver distributors. And the sub-dealers throughout the district are backing up their favorable outlook talk by placing orders for cars in goodly numbers and urging prompt delivery.

Even in the heart of the mountains, where snow is piled high, sturdy stockmen and miners now trudging over the huge banks of glistening whiteness on snowshoes and skis are telling about that new car and the long trips they have planned for next summer; while on the lower slopes of the gigantic Rockies and in the nearby valleys, where irrigation is the farmer's hope, all is contented and serene because of the abundance of water stored everywhere amid the cloud-clasped peaks.

### Registrations Increase

A surprising increase in motor car registration has been shown in Colorado every year since the state license law for motor vehicles went into effect in July of 1913. Every year the secretary of state has allowed for a liberal increase when ordering the state license tags, but every year he has been compelled to purchase several hundred additional tags beyond his original estimate. The 1914 record surpassed that of 1913 by nearly 5,000 cars, and 1915 added another increase of nearly 10,000. Colorado dealers are unanimous in supporting Secretary of State Ramer's estimate of a further gain of 12,000 in 1916, while many of them hold that 20,000 would be a safe estimate, and suggest that Secretary Ramer order the extra 8,000 tags early. The exact figures for the 3 years under the state registration law are:

1913	13,624
1914	18,433
1915	28,254



This is regarded as an exceptionally good showing for a state having a total of only a little over 800,000 people—scarcely a third as many as the city of Chicago alone. Besides, a large portion of the state is mountainous, motor roads are hard to build, and in some sections it would require traveling many miles to find enough settlers to fill a seven-passenger car.

These mountains are being penetrated more and more by good roads, and the mineral wealth hidden in these vast monuments of volcanic rock continues to attract rugged prospectors determined to dig out their share of treasure. Already three established transcontinental highways cross the main range of the Rockies in Colorado, while three more roads to connect important scenic and industrial sections will likely be completed within the next year, one of these traversing the entire length of the state and following the course of a proposed transcontinental route.

The mining industry of the state shows a gradual growth, which is considered far better than the frequent booms of those good old days when fortunes were made in a day by a lucky strike of high-grade ore—and often lost in a night through an effort to double them by tackling the other fellow's gambling scheme. Yet even the last few months have developed a near approach to an old-fashioned boom in Boulder county's tungsten district 50 miles from Denver, through new strikes of wonderfully rich ore, combined with rapid price jumps due to motor car and war demands for this product.

Stock raising is still a flourishing industry in Colorado and adjacent state, and the last two years have afforded favorable con-

ditions for both summer grazing and winter feeding, and also high prices have prevailed. The state is rapidly recovering from the setback suffered a few years ago on account of wildcat speculation and more and more outside capital is coming into the state for investment in legitimate development enterprises.

Although fully one-half of Colorado's more than 28,000 cars are now city-owned, nearly a third belonging to Denver alone, the proportion owned by farmers and stockmen is rapidly growing, and this class of trade promises to become an immense factor in the motor car industry in the Rocky Mountain region during the next decade. Many of these people bought cars at the time of the fall show held by the Automobile Trade Association of Colorado last October and hundreds more studied the new models at that exhibit, and dealers say they can still see benefits resulting from that event.

### Use of Tractors

The use of tractors in this territory has only begun, and the tractor business is still in the hands of implement dealers. Where tractors can be afforded, however, and are being tried out in cultivating a big acreage, their use is very successful. The tractor method is particularly valuable for deep plowing in the dry-farming sections, but of course it takes considerable capital to make the initial outlay for these machines, for gang plows and other equipment required.

Another aid to the motor industry in this section is the national park movement, with the recent establishing of the Rocky Mountain National Park, a scenic tract of 360 square miles of primeval playground



in the mountains 100 miles northwest of Denver, the opening of the Yellowstone National Park to motor travel, the proposed government road connecting these and other national parks in the West, and other enterprises for developing scenic resources and making these mountain attractions easily reached by motor car. Better roads mean more motor travel and more motor cars, more cars mean more revenue to build roads, more touring means more settlers and increased business in general for this part of the country, and the motor car and accessory dealers come in for their share of the satisfied smiling. For example, more than 20,000 motor tourists visited the Denver Motor Club in 1915 for road information, and many of these announced their intention of returning.

To take care of their growing business in the mountain territory, the Ford people built a \$150,000 assembling plant in Denver two years ago to supply Colorado, Wyoming, Utah and New Mexico. A prac-

tical indication of how the business of this one concern has grown here since that time is furnished by the fact that within a week ground will be broken for the erection of an additional \$120,000 building, which will practically double the new plant's present capacity sixty cars a day. This will also mean a considerable enlargement of the present force of 300 employes, and will thus contribute a substantial gain to general business in Denver.

During the last 3 months, the Ford increase over last year has been about 300 per cent here in Denver, and about 200 per cent throughout the entire territory of four states. The Buick, Grant, King, Hudson, Oakland, Chevrolet, Metz, Chalmers, Studebaker, Overland, Franklin, Saxon, Haynes, Paige, Abbott, Pierce, Packard, Pathfinder, Hupmobile and other established makes also show gains running to 100 and 200 per cent, while the Scripps-Booth, Enger, H. A. Lozier and other new makes in this territory are getting a substantial start.

The Buick sales for the last 7 months are within a dozen cars of the 650 record for the entire 12 months previous. The record sales increase found on an established line is the 500 per cent gain reported.

Statewide prohibition, which took effect January 1, also comes in for credit for helping along the motor car industry in Colorado this year. Many dealers also declare that this claim has a far more solid foundation than the talk of wags about the extra demand for cars to make flying trips to Cheyenne or other alcoholic cases just beyond the Colorado boundary. It is claimed that the saving of money is so noticeable among certain classes of people that the lower-priced cars in particular are selling better as a result of prohibition. Banks report surprising gains in savings accounts, one bank in a rather wild mining town claiming more than a hundred new savings accounts opened the first payday after the state went dry.

## Omaha District Views 1916 Season with Optimism

### 1915 Aggregate Sale of Cars and Parts Over \$18,000,000 — Expect to Exceed That Mark This Year

OMAHA, March 3—The annual Omaha motor car show, which closed Saturday, was more than a mere display of motor cars; it was the beginning of the motor business of 1916 in the Omaha territory; it also furnished a basis for estimates of the business that will be done this year in Nebraska and adjacent territory. The bulk of what the motor car industry terms the Omaha territory is made up of the state of Nebraska; linked to it are tiers of counties in South Dakota and Kansas and a considerable section of Iowa. The part of Iowa that goes to the Omaha distributor varies; in some cases it extends nearly to Des Moines.

#### 1915 Sets Record

In 1915 Omaha did a business of \$14,263,714 in cars and \$4,025,059 in parts, accessories and supplies. The car business was confined to Nebraska and sections of the adjacent states, but the supply and accessory jobbers pushed their wares even into Colorado, Wyoming and northern Missouri. This year the estimate is that business will increase by 50 per cent, which means that \$30,000,000 of motor car products will flow through Omaha, the gate city of the West, while the money will flow back through Omaha to the manufacturing centers of the East and Middle West, mostly to the Middle West.

Last year Nebraska bought slightly in excess of 18,000 cars; the adjacent sections to which Omaha distributes cars bought enough to make the gross figure a good 20,000; with an increase of 50 per cent, it means that the territory for 1916 will buy 30,000 cars. This is a conservative and not a phenomenal figure; a report of the

Commercial Club of Omaha states that there are 1,500 dealers in the state, but opposed to this is the statement of Secretary Clarke G. Powell, of the Omaha show association, that 4,700 dealers' passes were distributed. Thirty thousand cars to 1,500 dealers would mean twenty cars to a dealer, a reasonably safe figure.

Crops in Nebraska this year are, as a whole, estimated at 120 per cent of normal. Some products run above this. The prosperity also varies in sections. The state had too much rain last year and this affected the corn crop, one of the big products. In the southern counties 80 per cent of the corn is merchantable; in the north in runs as low as 20 to 30 per cent merchantable; the unmerchantable corn is "soft corn" and is sold at a lower price or is used for feeding stock.

But the soil products are valued at \$323,000,000, and the stock and other products are placed at:

Pork .....	\$102,000,000
Beef .....	92,000,000
Mutton .....	3,000,000
Poultry .....	7,000,000
Dairy products.....	40,000,000

Total .....

Adding to this the \$323,000,000 of soil products and the state during 1915 gave to the farmers \$567,000,000. Added to this is a not inconsiderable manufactured product of a varied nature. The 1915 year was a good year and 1916 holds promise. This means that the farmers are going to spend money for motor cars. New money has been used to pay off old debts, and a promising future helps loosen the purse strings for luxuries—although the motor car on the farm has long since ceased to be a luxury.

A man who travels the state for an Omaha distributor says he believes one-third of the farmers owns cars, one-third more can now afford to buy, and one-third cannot afford to buy but may in part develop later. This does not look like immediate saturation. If the entire one-third of farms bought a car this year it would mean 44,000, and if but 30,000 are sold in the whole Omaha territory this year, which is the estimate, there will still be a big margin—and each year develops added buyers.

#### COLORADO ROAD CO-OPERATION

Denver, Colo., March 4—A workable plan to secure statewide co-operation for uniform maintenance of Colorado roads, pledges from the 60 counties represented to work together for the best possible use of the \$2,000,000 highway fund for 1916 and a resolution urging the state highway commission to prepare an official state road book to be furnished to motorists at cost, were among the leading activities of the convention of the Colorado Good Roads Association held the last 2 days in Denver. The exact scheme for maintaining the roads in uniform condition across the state in a way to solve the problem of equal work where there is a wide difference in financial ability between counties has not been decided upon, but the movement to accomplish this needed improvement has been given a substantial start.

Elmer E. Sommers and William H. Ebmons, Denver, were re-elected respectively president and secretary, and John Y. Munson, Berthoud, was made vice-president to succeed Dr. W. P. Harlow, Boulder.



# The Motor Car Repair Shop



## Caring for the Battery—Part III.

**F**EW people realize that a healthy storage battery that is properly taken care of and is in continuous use does not require the addition of any acid to the electrolyte except at intervals long apart. Most batteries may need additional acid about once a year, but ordinarily all that has to be added is the water at regular periods of 1 week, or 2 weeks at the longest. So important is the matter of adding water regularly that most of the makers of cars have put such instructions at some conspicuous place on the cowl or under the hood, along with the instructions for oiling the motor. One is just as important as the other in the eyes of a great many. You would not think of running the engine without oil, nor would you knowingly run without water in the radiator. The same care that you give the cooling system and the lubrication system must also be accorded the battery if you are going to have any satisfaction out of the modern motor car.

Let us see what happens to the battery that is not given its weekly or bi-weekly drink of pure water. You know that water evaporates to some extent in the battery, and that the sulphuric acid does not. Hence there is a constant tendency for the electrolyte to have a stronger proportion of the acid, and this must be overcome by the addition of more water. The battery does not use up water as fast as the cooling system does, but the idea is the same. When the battery is charging a fine spray is given off by the solution, this usually being expressed as gassing. This spray is principally water vapor.

### Need of Filling

As the water is constantly being evaporated, since the battery is charging whenever the engine is running at the required speed, and as there is also bound to be some loss through spillage, etc., it will not take much over a week in summer, or 2 weeks in the winter, for the solution level to get below the tops of the plates within the cell. As soon as the plates become exposed to the air sulphation begins and that part of the plate that is out of the solution starts to harden. It requires the medium of the electrolyte to cause the chemical action which we investigated last week to take place, and hence as soon as any parts of the plates are out of the solution their capacity for the receiving or discharging of electrical energy is reduced in proportion to the amount they

### Further Facts the Owner Should Know About Electrolyte, Plates, and Their Upkeep

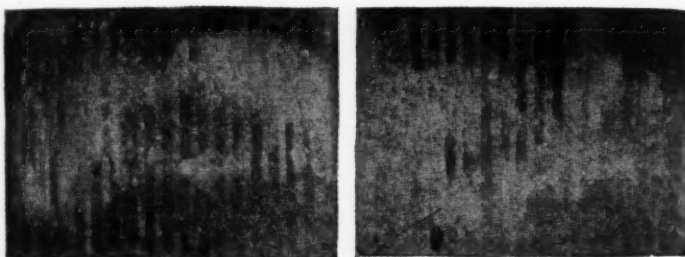


FIG. 1—EFFECT OF ADDING ACID

*Separators which have been ruined by filling the battery with acid instead of water for bringing the electrolyte to level. These separators are so rotted that they will fall to pieces if touched*

are exposed. Even if there were no other damaging results of not putting in water, you can see that as the water evaporated more and more, causing a constant lowering of the level of the electrolyte, the capacity of the battery would become less and less, until finally there would be so much more acid in proportion to the water that it would be impossible for the necessary chemical reactions to take place. The oxygen and the hydrogen in the water must be used, as we have already seen in Part II of this series.

The importance of using pure water to replace that which evaporates cannot be too strongly urged. We have already seen what the chemical action is when the battery charges and discharges, and how each chemical element does its part in the process. But if other elements are introduced into the solution, they have no function and are therefore detrimental. Their only result is to set up injurious reactions that defeat the purpose of the battery. In

fact, impurities in the lead or in the electrolyte set up local chemical action that is apt to ruin the plates. The makers of batteries see to it that the lead used in the grids is pure, but all that can be done after the battery gets into service is to attempt to impress upon the user the necessity for carrying out the purity idea all through. If the acid is not chemically pure, or if the water is taken from iron pipes or metal reservoirs so that it is more than likely to contain some iron or other metal in it, the efficiency of the battery is at once impaired.

This is why all the battery instruction books and all battery stations tell you to use either pure rain water or distilled water that you can get from a drug store. As the amount of water that has to be added is very small at each filling time,

it is not very expensive to purchase distilled water for this purpose. The careful motorist who realizes the necessity for care of the battery will keep a bottle of pure water in the garage all the time. Nearly all first-class garages in the cities keep distilled water constantly on hand. Often a motorist will laugh at the idea of adding pure water and will put some in that he draws from the tap. It seems to do the trick alright, and he sees no necessity for troubling about distilled water. Possibly once or twice this faucet water can be used without noticeably bad results, but in not a very long time, the effect on the battery will become apparent. When it gives out unexpectedly and when a new battery has to be purchased, this careless owner wishes he had been more judicious in the kind of water used.

### Not Too Full

In adding water be careful not to fill the cells too full. To keep the level  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch above the top of the plates is all that is necessary. If you fill the cells above this point the jarring and shaking of the machine when in service are apt to splash some of it out through the vent holes. This slopping is bad for the battery as a whole. The strong acid will eat the wood case in which the cells are kept and it will tend to corrode the terminals, cause injurious fumes within the battery box, and damage to the insulation on the wires. In case any water is spilled when filling or if any splashes out of the cells, wipe it off at once with waste or cloths.

This matter of splashing out of the cells

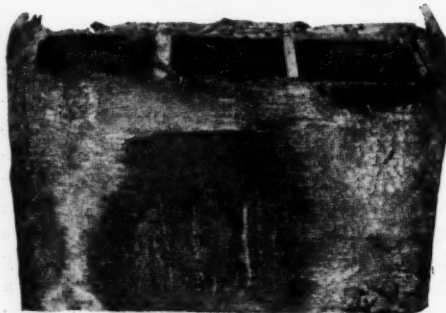


FIG. 2—EFFECT OF SLOPPING

*Here's how your battery will look if you overfill it. The solution slops over, soon rots the outer case and may eat out the bottom*



brings up the importance of having the battery properly fastened within its container so that there will be no chance for it to move around, thus keeping it rigid. Most makers of cars now have seen to it that suitable fastening hooks or other devices are used to anchor the battery within the metal box, but as there are many amateurs who have installed their own batteries, this point is especially emphasized for their benefit. Then, too, even though the battery is provided with suitable hooks to hold it down, it is well to test them occasionally to see that they resist any tendency of the heavy battery to shift or shake around within the box. Wood blocks wedged between the metal box and the battery will often help matters.

#### Open Cells Separately

It is important also to remember that all liquid drawn from the cells when taking hydrometer readings must be put back into them. You can draw enough of the electrolyte out to nearly bring the level below the top of the plates by using the hydrometer, and this obviously must be put back. You must be sure to put it back into the proper cell. The best way is to remove only the vent plug from the cell which you are testing at the time, and then there will be no chance of your forgetting which you took the liquid from. Replace that plug before going to another cell. It often happens that if you take all the plugs out at once you will forget and

put the solution that you have drawn into the hydrometer back into the wrong cell, thus bringing the level too low in one of the others and too high in this one. When you draw the electrolyte into the hydrometer, you take out acid as well as water, and if you then neglect to return this, but fill the cell to the proper level with water instead, as the writer has sometimes seen misinformed garage men do, you are weakening the acid in the solution.

Another little thing that might cause trouble is to use a dirty hydrometer. Sometimes foreign matter will get into it, such as particles of dust or dirt, or even a little oil or grease. These, if introduced into the electrolyte are apt to do harm. You should be sure the hydrometer is perfectly clean before taking any readings.

Next week Motor Age will go into some phases of the charging of storage batteries.

## Metallurgical New Process for Longevity Said to Increase Life of Motor Car Parts

**M**ETALLURGISTS in the motor car factories have been able to turn out steel so tough that it could be tied into knots. They have made it so hard that it can be used to cut glass. They have combined a tough core with a hard surface. Now one of them comes forward with a series of operations which makes possible a piece of steel tough within and on both sides, but hard on a series of points definitely placed.

The presence in the Maxwell plants of a copper-plating device is the key to this situation. The piece on which the operation is performed is the large ring gear which transmits power from the main shaft to the rear wheels.

The ring gear comes to the copper-plat-

ing bath, forged and machined. Before the bath, a workman covers the face of the teeth with a coating of wax. The copper is therefore deposited over the whole gear except the teeth.

The gear is next taken to a hardening heat treatment. The wax melts immediately and the hardening treatment takes effect on the gear teeth only, the copper-plate preventing the process from attacking the remainder.

The fact that a ring gear of this kind was recently run more than 22,000 miles without repair, and under A. A. A. observation in the recent motor non-stop Maxwell, is considered proof of the fact that gears produced in this way do not wear and become noisy.

## Giant Land-Cruisers of the Allies' Squadron of Anti-Aircraft Motors in France

*Above—A Buick, with searchlight, in service on the French front, its chief purpose being to warn against hostile aircraft when night flights are essayed by the German flyers*



*Below—A fleet of Pierce-Arrows equipped with high-angle rapid-fire guns designed especially for overhead firing in the ever-recurring battles with aeroplane scouts. At the right is a Pierce-Arrow with crew of four men*





# The Readers' Clearing House



## COOLING, IGNITION, CARBURETION Steam and Gas-Electric Trucks Are Also Manufactured

ST. LOUIS, MO.—Editor Motor Age—I would like to secure a general line of ignition and cooling systems and also a brief description of the fundamentals of the various types of carbureters used on motor trucks.

2—I understand that there are two types of trucks on the market, namely, gasoline and electric. If there are more than these I would appreciate your informing me.—Interested Reader.

1—Ignition, cooling and carburetion systems used on motor trucks do not differ fundamentally from the familiar types found on passenger cars.

There are two broad types of ignition, the make-and-break and the jump-spark forms. The former is now obsolete in modern motor vehicle practice. It operates on a low-tension, that is, low-voltage, circuit. The spark is intensified by leading it to contacts within the cylinder which are separated violently by mechanical action, this action being timed to occur at just the right point in the cycle and adjustable by hand.

The jump-spark system uses a current of high voltage which is passed through a spark plug in the cylinder, which has two electrodes or points. These are separated, one being grounded to the cylinder and the other insulated from it. The current is timed so that it is only permitted to flow through the plug at the moment of ignition, when it jumps from one electrode to the other and forms a spark.

There are two forms of jump-spark ignition, the low-tension form and the high-tension system. The low-tension system consists of a battery or a magneto or other current producer which is wired to an induction coil so that it is stepped up to a high voltage before going into the spark-plug or secondary circuit. The high-tension system consists of a magneto which generates a high-voltage circuit direct by means of induction winding in the armature and a breaker mechanism which diverts the current through the secondary circuit suddenly and at the time when the greatest current is being generated by the magneto.

2—Besides the gasoline and electric types of trucks, there are two others, the gas-electric and the steamer. The gas-electric is really a gasoline truck, but it differs from others in that the power of the engine is not transmitted direct to the wheels by a mechanical connection, but instead it is converted into electrical energy and transmitted through electric motors to the wheels.

The steamer, as its name indicates, operates by steam power.

### Removing Studebaker Motor

Beasley, Ark.—Editor Motor Age—Could a Studebaker motor, rated by the manufacturer

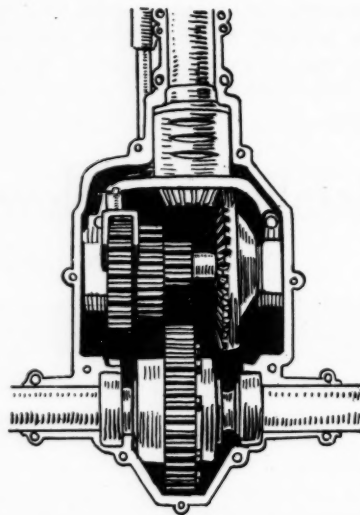


Fig. 1—Cameron three-speed spur gearset which gives three forward variations. The propeller shaft telescopes, allowing endwise play that brings the spur gears into mesh with the driven gear

at 40 horsepower, be removed from the chassis and used to pull a stationary plant requiring about 12 or 15 horsepower?

2—Would the fastening of this plant to a concrete base injure the engine in running?—R. M. S.

1—Yes.

2—No.

## SOME FORMS OF TRUCK DRIVE Engine Auxiliaries, Brake Horsepower Is Actual Power

Minneapolis, Minn.—Editor Motor Age—We would like to inform ourselves on the various forms of motor vehicle drives and their industrial application and would appreciate a line or so from you describing the various types that have been and are at present being used and the advantages and disadvantages of one over the other.

2—The term brake horsepower used by the motor truck trade is not quite clear to us and we would appreciate your enlightening us on this point; also advising us what formula or method is standard for calculating the horse power of a motor.—Midwestern Reader.

1—The primary form of motor vehicle drive is the single chain, connecting a transverse transmission shaft with a live rear axle. This was the first popular form of drive. A development of this drive was the double chain, in which the rear axle was dead or stationary, like that of a wagon and separate chains drove each of the rear wheels. With the development of the four-cylinder motor which had to be placed longitudinally instead of transversely of the chassis, the bevel gear made its appearance. At first the bevel gear was used to drive a jackshaft, that is, a transverse transmission shaft, from which one or two chains led back to the driving wheels. This was for many years the standard drive for both passenger and commercial vehicles.

It was superseded in the passenger field by the straight bevel gear drive after the perfection of the Cardan shaft. By straight bevel drive is meant the incorporation of

the bevel gear in a live driving axle, the driving gear being connected with the powerplant by a shaft with flexible joints. These joints, called universals, permit deflection of the shaft while keeping it torsionally rigid.

In the truck field, however, the bevel drive did not make much headway, owing to the limited reduction practicable. In heavy trucks a direct drive reduction of as much as twenty turns of the engine shaft to one of the road wheels is often needed and this the bevel gear cannot successfully give. So, until this year the double-chain drive has been standard on motor trucks.

To enable motor trucks to possess the advantages of inclosed shaft drive and still have low gear-reductions, other forms of drive were developed. The first of these is the double-reduction form. This comprises a primary and a secondary reduction. One form is to have the driving shaft geared at a reduction to the back of the gearset and then geared at a further reduction to the axle. Thus, while the bevel gears in the axle may have only a 3 to 1 reduction, the spur gears on the shaft may have a similar 3 to 1 reduction and the total reduction will be 9 to 1. Another form of double reduction is that wherein the gears are all in the rear axle, the primary reduction being through bevel gears and the secondary through spur gears.

A still different form of double-reduction drive is that known as the internal-gear drive, consisting of a bevel-driven jackshaft attached rigidly to the axle instead of on the frame and driving the wheels individually through spur gears instead of by chains running over sprockets. The gears on the wheel drums are internally-toothed, whence the name is derived. A variation of this drive is the external gear or spur gear form, in which the wheel gears are external instead of internal.

Spur gears have also been used directly from the transmission shaft to the wheel drums, but this is principally on the early forms of electric vehicles. The DeDion form of internal-gear-driven axle differs from others in that the jackshaft is carried on the frame, just above the axle and its driving shafts are jointed to allow for spring action. The Latil form of external-gear drive is arranged similarly.

Of still later development is the worm-gear drive. Here we return to the lay-out of the simple bevel-driven axle, but we substitute a form of gearing which is adapted to much lower reductions than are practicable with the bevel gear. This worm gear comprises a sort of coarse-



threaded screw, meshing with a spur gear with skewed teeth. As the screw or worm, as it is called, revolves, it turns the gear, or worm-wheel as it is called.

Rare forms of drive worth mentioning are the Austin form and that used on several European and American four-wheel-driven vehicles. The Austin drive comprises individual Cardan shafts leading to bevel gears on each rear wheel drum to bevel gears on the transmission shaft. These two shafts converge at the front and drive on what is substantially a double-reduction plan. The other form comprises a live axle driven by bevel or worm gears with live steering kingbolts. These kingbolts are driven by bevel on worm gears from the live axles and in turn drive through other bevel or worm gears, live wheel spindles.

Space forbids entering into any of the variations of these drives. Each axle has advantages of its own. Which of the forms deserves greatest recognition is not possible to determine, inasmuch as some forms are better adapted to certain applications than others, but not so well adapted to others. Those that survive must possess merit or they would be abandoned as have some of the methods of drive described.

2—Brake horsepower is the horsepower of a motor derived from an actual test made with an appliance known as the Prony brake. This consists of a brake which is fitted over the flywheel and which has an extended arm, bearing on the bed of a scale. The engine is started and run with the brake off and then, with the engine still running, the brake is gradually tightened until it lifts a pre-determined weight. This weight is gradually increased until the maximum load the engine will lift is determined. By calculating the length of the lever, the actual torque in pounds may be readily determined, and by considering the speed at any given radius the other factors of horsepower are found, so that the power of the motor may be found in foot-pound-minutes, 1 standard horsepower equalling 33,000 foot-pounds per minute.

The standard formula for horsepower is that now known as the N. A. C. C. formula, and incorrectly, though quite generally as the S. A. E. formula. This formula was originated by the association of Licensed Automobile Manufacturers and is expressed as follows:

$$\frac{D^2 N}{2.5} = \text{N. A. C. C. horsepower}$$

When D is the diameter of the cylinder in inches and N is the number of cylinders.

#### Rehabilitating Burned Wiring

Detroit, Mich.—Editor Motor Age—I have a 1913 6-60 Cole, equipped with the Delco system. The car caught fire and the storage battery, starting switch and practically the entire electric system was destroyed. I am rebuilding the car, but do not intend to fix up the starting or lighting system. The generator is all right, but the distributor is burned. If I get a new distributor what will I have to put to put the ignition system in shape? The generator will

be used for ignition only, as I have cut the starter and lighting out.

2—Publish a wiring diagram of the ignition system only, showing the wires running from the generator to the distributor, ignition coil, switch, etc.—G. W. Dull.

1—Putting the ignition system in shape entails almost as much work and expense as to rehabilitate the lighting, starting and ignition. For the ignition it will be necessary for you to have the distributor, battery, ignition coil and relay; in fact, everything except the starting switch and wires running to your lights. Since yours is a single unit system, you have only to run wires to the motor-generator from the battery and starting switch and you will rejuvenate the starting system of your car. You might leave out the starting and wire the car for lights, but in any event, if you renew the ignition system, it will cost you very little more to put the whole electrical system in shape.

2—In Fig. 2 is shown the wiring of your car, the dark lines indicating the parts necessary for ignition only, while the light lines indicate the starting and lighting wiring.

#### DEFINING MEANING OF TORQUE

##### Torsion, Torque, Radius Roads and Strut Rods Defined

Chicago—Editor Motor Age—Please inform me as to what is the difference, if any, between a torsion, torque, strut and radius rod?—H. S. Darwin.

Torsion rods, torque rods, torsion tubes and torque arms are all the same in office. This office is to prevent a live driving axle from twisting axially in response to its own and the truck's inertia instead of transmitting the torque of the drive. In order words, all of these devices are to resist the torque reaction. The torque is the twisting effort of the driving means whose object is to turn the wheels. There are two general forms of torque members, the

torsion tube and the torque arm. The torsion tube is a tubular inclosure for the driving shaft which is usually yoked or otherwise pivoted to the frame at its front. The reaction of the axle in driving causes it to press on the under side of the frame. The reaction in braking is in the reverse direction and causes it to pull downward on the frame. A torque arm has a similar mission, but it is in the form of an arm, either to one side or directly under the driving shaft.

The radius rod or strut rod is a member designed to keep the axle in place against its tendency to move forward under driving stress or to move backward when the brakes are applied. The terms are synonymous.

#### ONE CYLINDER LEAKS; OTHERS GOOD

##### Would Fitting New Rings Make Compression Greater Than Other Three?

LeMars, Ia.—Editor Motor Age—Cylinder No. 2 on my four-cylinder car leaks compression between the piston and the cylinder into the crankcase, while the other three cylinders are as good as new. Would fitting the defective cylinder with new piston rings cause the compression to be more than the others and perhaps start vibration?

2—Does Motor Age suggest putting one new piston ring in each cylinder?—R. A. Berner.

1—It is impossible to say whether the No. 2 cylinder would be benefited greatly by the use of new piston rings, because the leak might be due to bad scoring from the cylinder, in which case it would have to be rebored. If it is due simply to uniform wear, the fitting of new piston rings and more particularly the non-leaking type of piston rings, probably will prove a remedy. However, this leak may be caused by the slots in the piston ring coming in line in which case new rings will not be necessary, and you will need only to space the slots in the various rings so they do not come in line.

2—It is doubtful if the fitting of new

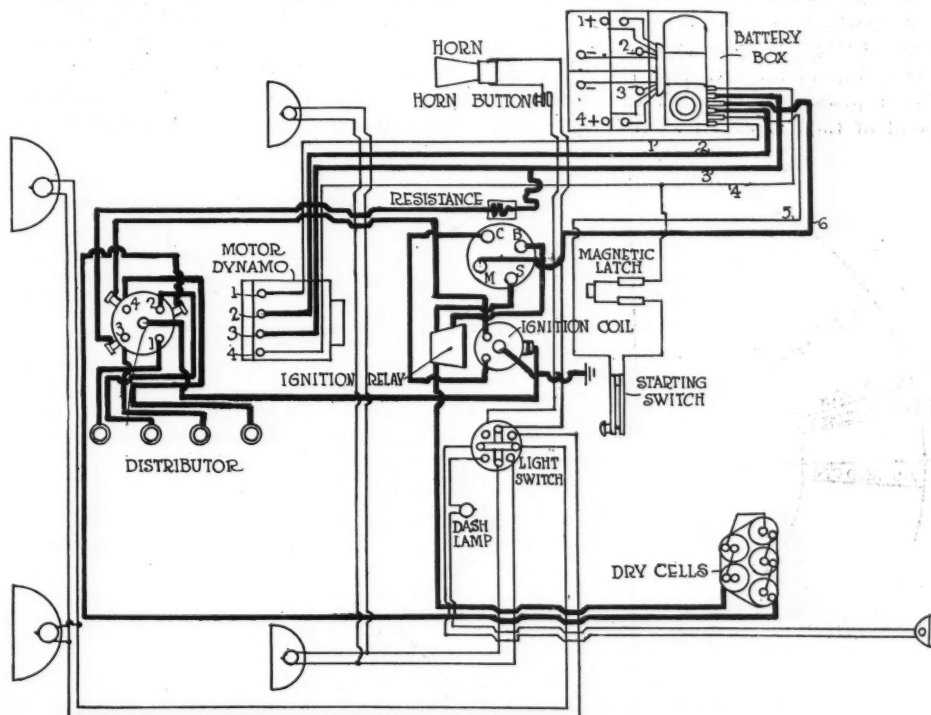


Fig. 2—Delco wiring system on 1913 Cole. The heavy lines show ignition and the light ones the lighting and starting

rings will improve the compression in No. 2 cylinder so much as to make it much more than that of the others.

### TIMING OF AN OLD REGAL

Some Intimate Information About a 1910 Car—Two Gear Ratios Used

DeKalb, Ill.—Editor Motor Age—What was the gear ratio in all speeds of the 1910 Regal 30, five-passenger touring car?

2—How is the gear ratio in high found on this car?

3—What is the valve timing of this motor? How should it be timed for high speed work?

4—What is the bore and stroke of this motor?—A Reader

1 and 2—The majority of the Regal 1910, 30 horsepower cars were equipped with rear axle drive gears having a ratio of approximately 4 to 1, the drive pinion having 13 teeth and the ring gear 53 teeth. In a car equipped with drive gears of this ratio the ratio between the revolutions of the engine crankshaft and revolutions of the rear wheels is 4.07 to 1 for high speed or direct drive, 6.1 to 1 for intermediate speed; 10.8 to 1 for low speed and 15.05 to 1 for reverse speed. Some of the 1910 Regals, however, have a ratio of approximately 3.5 to 1 for the rear axle drive gears, the drive pinion having 15 teeth and the ring gear 53 teeth. With this rear axle ratio the ratio from the engine crankshaft to the rear wheels is 3.53 to 1 for the high speed or direct drive, 5.3 to 1 for the intermediate speed, 9.42 to 1 for the low speed and 13.04 to 1 for the reverse speed.

3—If you will examine the rim of the flywheel you will find that it has several lines marked on it, and opposite these lines the figures 16, 34, 40, 10,  $\frac{1}{4}$  and  $\frac{2}{3}$ . These lines and figures represent distances or measurements in degrees from the two lines diametrically opposite each other—one marked " $\frac{1}{4}$ " and the other " $\frac{2}{3}$ ." These lines indicate the point at which the different valves open and close. Then, the flywheel is turned so that the line marked " $\frac{1}{4}$ " is up and coincides with the center line of the cylinders, the No. 1 and No. 4 pistons are just at the uppermost point of their stroke or at the upper dead

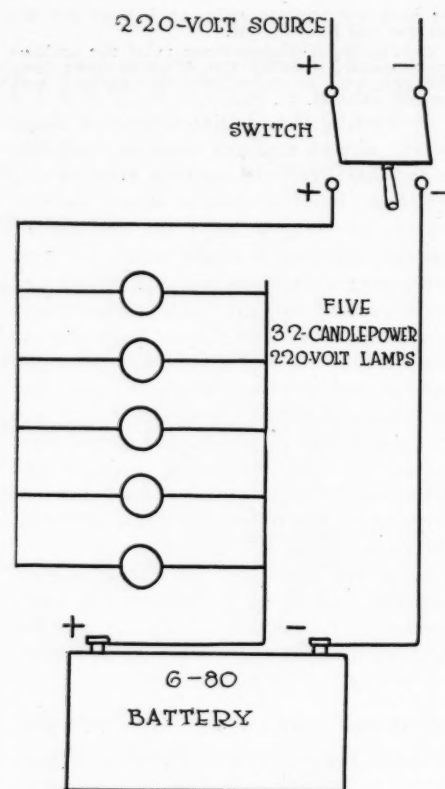


Fig. 4—Connections for charging battery on 220-volt D. C. circuit

center. When the line marked " $\frac{2}{3}$ " is up in line with the center line of the cylinders, the No. 2 and No. 3 pistons are at upper dead center.

To determine whether or not the valves are timed properly, first open the relief cocks on top of the cylinders, then turn the flywheel to the left until the line marked " $\frac{1}{4}$ " is opposite, or rather directly under the center line of the cylinders. At this point the exhaust valve in either No. 1 or No. 4 cylinder should just commence to close. If you find that the exhaust valve in No. 4 cylinder is beginning to close, and you wish to check up the valve timing of No. 1 cylinder turn

the flywheel around to the left one complete revolution, until the line " $\frac{1}{4}$ " is again brought under the center line of the cylinders; then continue slowly turning the flywheel about an inch or so to the left until the line marked 10 coincides with the center line of the cylinders. This is the point at which the exhaust valve in the No. 1 cylinder should just seat itself or close. To determine whether or not the valve is seated, see if the tappet or push rod underneath the valve can be turned with the fingers. If the tappet turns freely the valve is seated, and if the tappet is hard to turn, that will show that the valve is still being held slightly open. If this is the case, loosen the lock nut on the tappet screw and turn the screw down until the valve just seats; then turn the lock nut down tight against the tappet.

To check up the timing of the inlet valve in the same cylinder turn the flywheel  $\frac{3}{4}$  inch or so toward the left, until the line marked 16 comes under the center line of the cylinders. At this point the inlet valve in the No. 1 cylinder should just begin to open. Turn the flywheel a little better than one-half a turn to the left, stopping when the line marked 34, three lines to the right of the " $\frac{2}{3}$ " center line comes in line with the center of the cylinders. At this point the inlet valve in the No. 1 cylinder should just close.

To see if the exhaust valve in the No. 1 cylinder opens at the proper time, revolve the flywheel three-quarters of a turn to the left, and stop when the line 40, the first line to the left of the " $\frac{2}{3}$ " center line comes in line with the center of the cylinders. This is the point where the exhaust valve in No. 1 cylinder should just begin to open. The above completes the timing of cylinder No. 1.

To time cylinder No. 2, turn the flywheel until the line marked " $\frac{2}{3}$ " is in line with the center line of the cylinders. If the exhaust valve in the No. 2 cylinder is closed, turn the flywheel through one complete revolution, until the line " $\frac{2}{3}$ " is up again; the exhaust valve in No. 2 cylinder should then just be starting to close. Proceed now as in timing the No. 1 cylinder.

The No. 4 cylinder is timed from the center line " $\frac{1}{4}$ " and the No. 3 cylinder from the center line " $\frac{2}{3}$ ." When the valves are closed there should be clearance between the valve stems and the tappet screws of from .003 to .004. This amount of clearance is necessary to allow the valves to seat tightly.

Diagram showing the timing of this engine is given in Fig. 3.

4—The bore is 4 inches and the stroke 4 inches.

### The Meaning of High Speed Motors

Goshen, Ind.—Editor Motor Age—What is a high-speed motor? Is it correct balance of motor parts and correct valve and ignition timing that make them run up to 3,000 to 3,400 r. p. m.?

2—What is the diameter of the Hudson Super Six crankshaft and width of the crankshaft and connecting rod bearings?

3—What is the making of a long-life motor? Is it not width of crankshaft bearings, con-

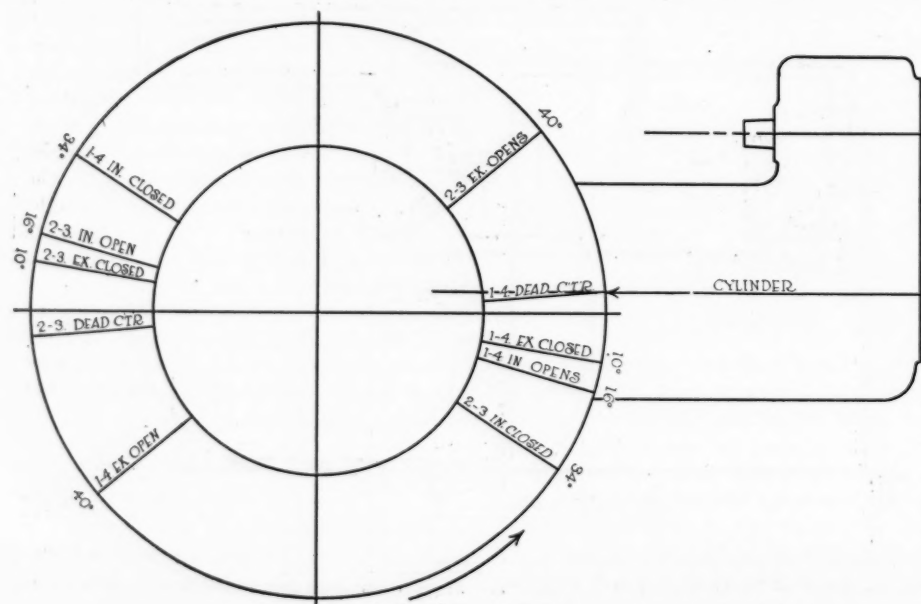


Fig. 3—Diagram showing timing of 1910 Regal motor



necting rod bearings, and made as near vibrationless as possible?—A. J. Gorsuch.

1—By the term high-speed motor is meant a motor so designed as to balance, timing and port and valve sizes that it can be run up to unusually high crankshaft speeds without a falling off in power developed and without undue vibration. The term high-speed is relative, but engines running a crankshaft speed greater than 2,000 r.p.m. may be considered a high-speed motor.

2—The diameter of the Hudson Super Six crankshaft is — inches although the crankshaft between the connecting rods and the bearings is — inches.

3—Yes.

### LINING UP FRONT WHEELS ON HUPP Camber as Given by Factory Is Explained for Reader

Bradgate, Ia.—Editor Motor Age—Kindly give directions for lining up the front wheels on a 1913 model 32 Hupmobile.

2—What is the camber as given by the factory?—Motorist.

1 and 2—In lining up the front wheels the first thing is to make sure that the wheel bearings are properly adjusted. They should be just tight enough so that there is no side play in the wheels, but on the other hand, they should not be so tight that the wheels bind and do not turn freely. This done, take a long stick or rod that will reach from the inner edge of one rim across to the inner edge of the other. Then measure the distance between the rim edges horizontally back of the center of the wheel. Mark this distance on the stick, and then try it on the rims horizontally in front of the wheel centers. The front distance should be  $\frac{1}{4}$  inch to  $\frac{3}{8}$  inch less than the distance across the back of the hubs. Fig. 5 shows these two dimensions diagrammatically. Dimension M should be  $\frac{1}{4}$  to  $\frac{3}{8}$  inch less than dimension N. If you find these distances are not correct, you can get the proper adjustment by taking up or letting out on the steering cross rod which parallels the axle and runs across just back of it. First loosen the lock nut at one of the ends, then take out the pin that goes through the steering arm and yoke, and screw the yoke out or in as the case requires. Then check the wheel alignment again and after making sure you have it right, tighten the lock nut.

### In Re Locking Devices

Elkhart, Ind.—Editor Motor Age—About 2 years ago through the Readers' Clearing House column, the writer called attention of the manufacturers to improvements in motor car tops; as a result we are today all enjoying the convenience of the one-man top.

Now let us try it again, regarding the locking devices: Thousands of cars are stolen every year. There are a number of locking devices in the market, but none of them has been generally adopted. Key and combination locks will not fill this bill. They are inconvenient and cumbersome

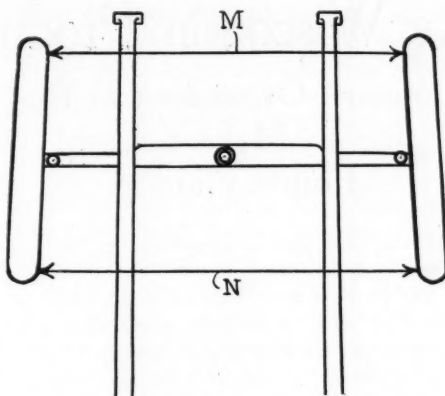


Fig. 5—Showing how to line up front wheels of a Hupp 32

### Inquiries Answered and Communications Received

Interested Reader.....St. Louis, Mo.  
R. M. S.....Beasley, Ark.  
Midwestern Reader.....Minneapolis, Minn.  
G. W. Dull.....Detroit, Mich.  
H. S. Darwin.....Chicago, Ill.  
R. A. Berner.....LeMars, Ia.  
A Reader.....DeKalb, Ill.  
A. J. Gorsuch.....Goshen, Ind.  
Motorist.....Bradgate, Ia.  
E. Timmerhoff.....Elkhart, Ind.  
W. H. Barnhart.....Starbuck, Wash.  
Charles A. Niven.....Seattle, Wash.  
R. W. Kearsse.....Shrhardt, S. C.  
H. A. Wetmore.....Sioux City, Ia.  
C. H. Mathis.....Herrin, Ill.  
No communications not signed with the inquirer's full name and address will be answered in this department.

some to handle. The locking device should be fitted to the cars at the factory.

The insurance companies, in their last general meeting, resolved they either had to raise the insurance rate or the manufacturers had to equip his cars with a substantial locking device. In the writer's opinion the motor car manufacturers and motor car insurance companies should get together and offer a substantial cash reward to any inventor who would solve this situation. I do not believe in patenting this device, which should be free to all manufacturers without any monopoly or other compensation.

First, this locking device should be fitted to the car at the factory.

Second, it should be inexpensive, should avoid all key and combination locks, switch plugs, etc., as none of them will give satisfaction and the thief will steal the car in spite of them.

In the writer's opinion a locking device with thousands of different combinations could easily be constructed and fitted to the car at a very little expense.—E. Timmerhoff.

### Cameron Three-Speed Gearset

Sioux City, Ia.—Editor Motor Age—I will be greatly obliged if you can publish a diagram of the three-speed transmission used on the Cameron air-cooled car about 3 or 4 years ago.—H. A. Wetmore.

1—Fig. 1 shows a cross section of the Cameron three-speed spur gearset carried on the rear axle which gives three forward variations. With a telescoping propeller shaft it is possible to slide the bevel gear, spider and three spur gears endwise until any one of the spur gears mesh with

the driven gear operating the rear wheels. A rocking operation brings the desired spur gear into mesh with the driven gear.

### EFFICIENCY OF ALLOY PISTONS

Generally Conceded That They Add From 2 to 15 Per Cent

Starbuck, Wash.—Editor Motor Age—How much more power will be developed in a 4 by 5 four-cylinder motor by using aluminum rods and pistons instead of the iron ones usually supplied.

2—About how much difference in weight?—W. H. Barnhart.

1—It may be expected that from 2 to 15 per cent more power may be obtained by using aluminum alloy connecting rods and pistons instead of the iron ones. This is due mostly to the fact that it will permit the engine to be running at somewhat higher speed without undue vibration. How much increase in power may be obtained and how much increase in speed depends upon the design of the motor, particularly the size of the valves and manifold.

2—Aluminum rods and pistons will weigh from 25 to 50 per cent of the iron ones.

### Last Locomobile Four in 1913

Seattle, Wash.—Editor Motor Age—When was the last four-cylinder Locomobile made? In what year?

2—Did the Locomobile Co. ever build a four with block-cast cylinders?—Charles A. Niven.

1—The last Locomobile four was the Type L, 1913 model. This was a shaft drive. The chain-drive four was discontinued in 1910.

2—No. All Locomobile engines have cylinders cast in pairs.

### Charging Storage Batteries

Ehrhardt, S. C.—Editor Motor Age—I want to use a 220-volt direct light current to charge storage battery. Please give diagram showing how to wire a set of lights, also number of lights and size to reduce current for 6- or 12-volt batteries.—R. W. Kearsse.

1—This is shown in Fig. 3.

### What Motor Gives Most Power

Sauk City, Wis.—Editor Motor Age—Which motor develops the most power, the valve-in-the-head, the L-head, or the T-head?

2—Providing they are of equal size, how much per cent of power does the one develop over the other?—Up-to-date Auto & Supply Co.

1—The valve-in-the-head motor is generally credited with giving slightly more power for the same size and weight of motor than either the L-head or T-head. The T-head comes second in the matter of power for piston displacement. The L-head gives slightly less power but weighs less than the T-head. This, of course, is assuming they are equally well made and well designed.

2—As to the per cent of advantage of the different types, this depends entirely on such things as timing, valve sizes, port sizes, carburetion, and a dozen other things.

### Timing 1913 Eisemann Magneto

Herrin, Ill.—Editor Motor Age—What is the timing of the Eisemann magneto on the 1913 Empire?—C. H. Mathis.

The timing of the magneto on this model is  $17\frac{1}{2}$  degrees in advance of dead center. This model used fixed ignition.

## New Maibohm Car, a Wisconsin Product, to Sell at \$595

THE Maibohm roadster has been introduced and is to sell at \$595. This car is of the light car type with low-hung and distinctive lines. This car is the product of the Maibohm Motors Co., Racine, Wis., recently formed and headed by H. C. Maibohm, formerly connected with the Locomobile Co. of America and until recently president of the Motor Supplies Co. Associated with him are P. C. Maibohm, former president of the Maibohm Wagon Co., and J. R. Foster, former president of the Foster-Lockwood Oil Co.

### Temporary Quarters Secured

Temporary manufacturing facilities have been secured in Racine and negotiations are now pending for a permanent factory site. The company will produce 2,000 cars during the first year, two-thirds of which are said to be already sold to dealers. Particular attention has been paid to the comfort of passengers, the seats being unusually low and on an almost direct horizontal line with the pedals, which are adjustable to any desired leg room. The

### Concern Organized at Racine to Make a Light Four-Cylinder

steering post also is adjustable to the requirements of the operator.

The four-cylinder, valve-in-head motor is provided with three-point suspension and is rated at 14.4 horsepower, having 3 by 5-inch cylinders. It has a detachable cylinder head and mud-tight protections. Lubrication is by constant level splash under the connecting rods and pump to the three main bearings. Cooling is thermo-syphon with extra large inlet and outlet manifolds cast integrally with cylinder block. Ignition is Atwater-Kent with automatic spark advance, current being supplied by a 6-volt 100 ampere hour battery located under the seat in a steel hanger.

Starting and lighting is by an inclosed silent-chain drive single-unit system attached to front gear case. Fuel is gravity

supplied by a 10-gallon gasoline tank located in the cowl.

The frame is a pressed steel channel section 3 by 1/8-inch, curved over the rear axle to permit underslung semi-elliptic rear spring construction. The wheelbase is 105 inches and size of tires is 30 by 3 1/2. Wood or wire wheels are supplied at the option of the purchaser.

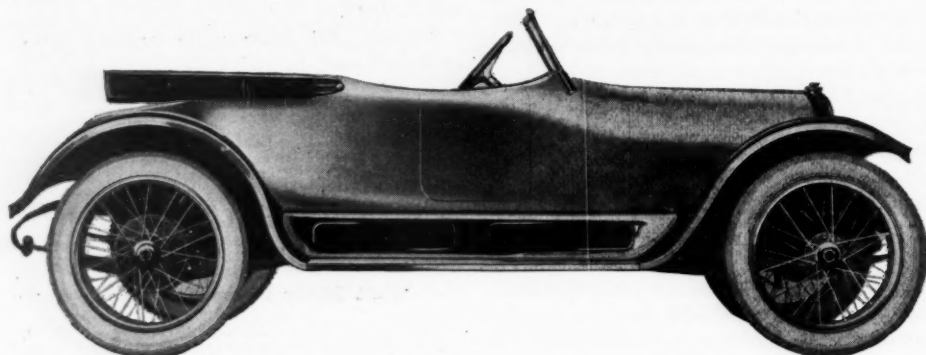
### Dry-Disk Clutch Used

Throughout the chassis, with exception of motor, Hyatt and Timken bearings are used. The gearset is compact in form and with the dry-disk clutch is supported at the rear of the motor. Three speeds are used and center control levers are conveniently placed. The Hotchkiss system of propulsion is used and the master leaf of each rear spring has been strengthened by the use of a special heat-treated steel. Both front and rear springs are of the semi-elliptic type, 2 inches wide and almost flat.

The rear unit is built along standard lines with a pressed steel housing that carries the weight of the car and relieves the drive shaft from any duty except propulsion of the car. Equipment features include electric starting and lighting, a flush type speedometer and lock switch, electric horn, rear tire carrier, one-man top, tools, etc.

## Cloverleaf Roadster Body for Overland 86

New Type Made by Ohio Electric Car Co.

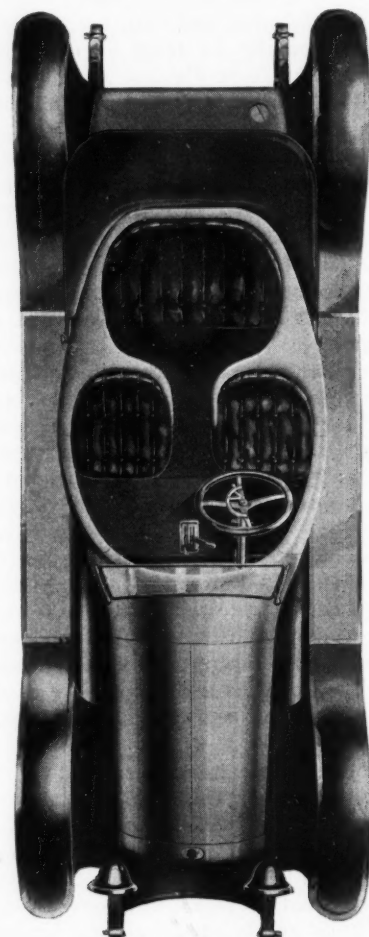


Above is shown a side view of the new Cloverleaf body for the Overland model 86 and at the right a sky-view, illustrating the seating arrangement

THE Willys-Overland Co., Toledo, O., announce a new Cloverleaf model roadster body for the model 86. Two views of this body are shown herewith. The body is the product of the Ohio Electric Car Co., Toledo, and is made in limited numbers. Four options are given as to color scheme, these being battleship gray with the wheels light gray, bright green with the wheels straw color, vermilion red with the wheels the same or Yale blue with the wheels light gray. With any of these the fenders and trimmings are black enamel.

Ample room for passengers is provided in this new Cloverleaf body for the Overland 86. The width of the rear seat is 35 inches and the space from the front of the rear seat to the back of the front seat is 12 inches. The depth of the rear seat is 17 inches and the aisleway between the front seats is 8 inches. The depth of the front seat is 17 inches and the width 19 inches. The leg room for the driver, that is between the front seat and the dash, is 19 1/2 inches. It will be seen, according to the two illustrations, that there is a blending of lines which make for symmetry. Also it will be noted that the windshield is cut on the bias.

The seating arrangement provides ample room for four passengers. The gasoline tank has a capacity of 15 gallons and is carried on the rear deck with the filler on the left. Equipment includes tire irons, and one extra rim, tires being carried upright on the rear. Orders for the chassis of this car are placed with the Willys-Overland Co., with instructions to deliver to the Ohio Electric Car Co., with whom the order for the body is placed, settlement for the body being made to the latter.





**MISSOURI COMPANY TO BUILD TRUCKS**

Hannibal, Mo., Mar. 6—The Roto Motor Co. has been incorporated here with a capital stock of \$350,000 for the manufacture of light delivery trucks. The new company was organized by N. L. Le Blond, manager of the Hannibal Wagon Co., and he expects to start the manufacture of a ½-ton model within the next 60 days.

The Hannibal Wagon Co. will pass out of existence and its plant at Collier and South Eleventh streets will be turned over to the new concern. L. Edgar Jerome, Chicago, is heavily interested in the Roto company and will reside here. The president will be T. A. Legris, Kankakee, Ill., a member of the Legris Bros.' Banking Co., of that city, and J. E. McNally of this city will be the vice-president.

The plans are to build at least 1,500 trucks the first year. It will have a wheel-base of 112 inches, with 31 by 4 tires, a 3½-inch bore overhead-valve engine of the factory's own design, and will be sold for

\$695, equipped with electric starting and lighting system. The car will be assembled at the plant here. A trailer also will be placed on the market.

**ORGANIZE TRI-STATE DEALERS**

Sioux Falls, S. D., March 3—At the recent motor show held in Sioux Falls, dealers from South Dakota, western Minnesota and western Iowa gathered here, not only for the purpose of taking in the show, but also for the organization of an association to cover the above territory.

Officers and directors were elected as follows: President L. G. Ochsenreiter, of Webster; Vice-Presidents J. M. Muggli, of Ramona; D. L. McKinney, Sioux Falls, S. D.; Secretary-Treasurers: Charles Hirsch,

of Tripp, S. D.; J. M. Wilson, of Sheldon, Iowa. Directors: J. A. Saxon, of Worthington, Minn.; L. L. Stone, of Lakefield, Minn.

**CONSOLIDATE PONTIAC CONCERN**

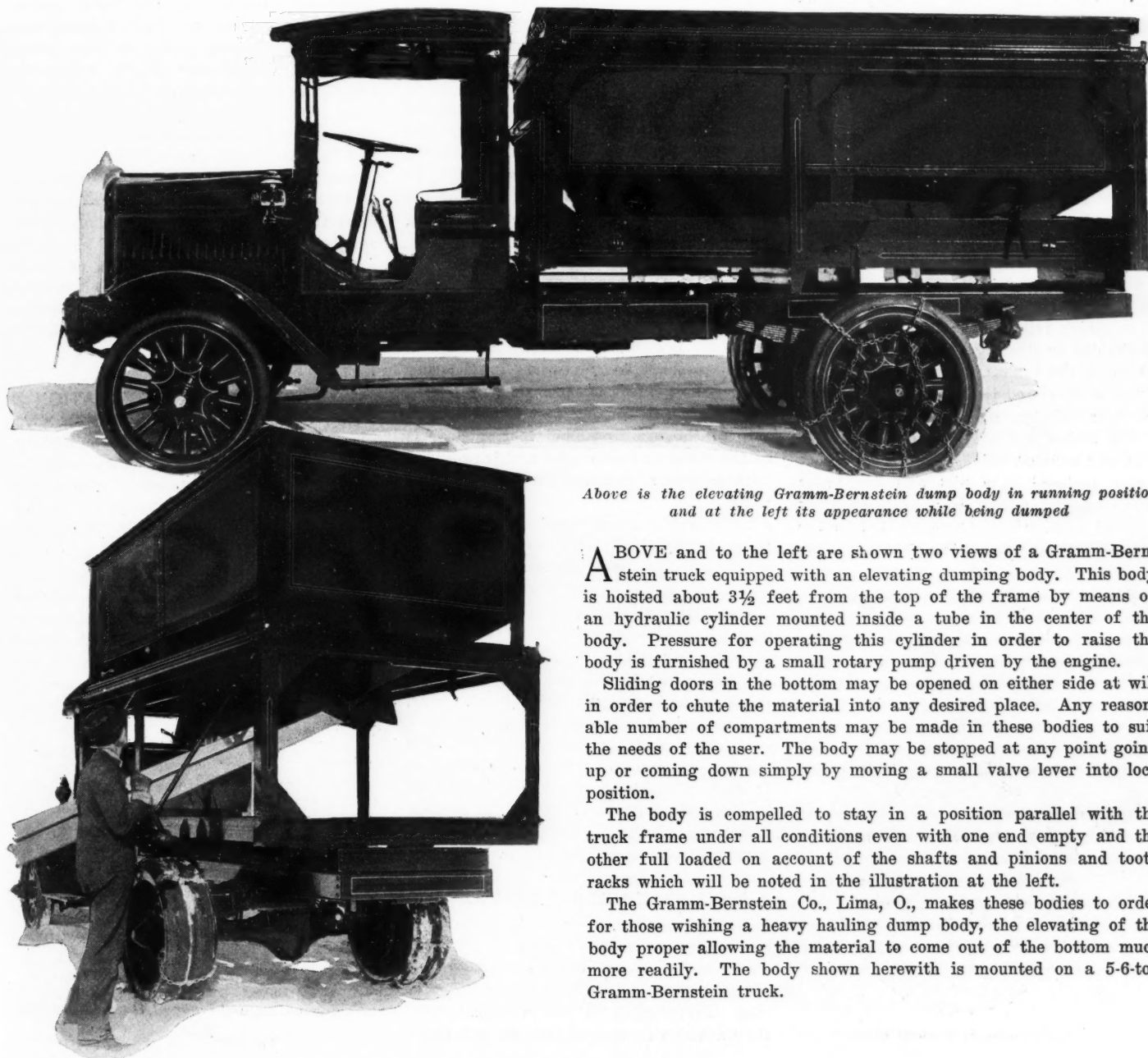
Detroit, March 4—The Pontiac Chassis Co. and the Detroit Commercial Car Co., both of whom have been occupying the same factory in Pontiac, and which were closely allied, have been consolidated under the name of the Palmer-Paine Motors Co.

**DORT RAISES PRICE**

Flint, Mich., March 4—The price of the Dort touring car has been increased from \$650 to \$665.

## Dump Body for Gramm-Bernstein Trucks

### Elevates to Allow Greater Ease of Unloading



*Above is the elevating Gramm-Bernstein dump body in running position and at the left its appearance while being dumped*

ABOVE and to the left are shown two views of a Gramm-Bernstein truck equipped with an elevating dumping body. This body is hoisted about 3½ feet from the top of the frame by means of an hydraulic cylinder mounted inside a tube in the center of the body. Pressure for operating this cylinder in order to raise the body is furnished by a small rotary pump driven by the engine.

Sliding doors in the bottom may be opened on either side at will in order to chute the material into any desired place. Any reasonable number of compartments may be made in these bodies to suit the needs of the user. The body may be stopped at any point going up or coming down simply by moving a small valve lever into lock position.

The body is compelled to stay in a position parallel with the truck frame under all conditions even with one end empty and the other full loaded on account of the shafts and pinions and tooth racks which will be noted in the illustration at the left.

The Gramm-Bernstein Co., Lima, O., makes these bodies to order for those wishing a heavy hauling dump body, the elevating of the body proper allowing the material to come out of the bottom much more readily. The body shown herewith is mounted on a 5-6-ton Gramm-Bernstein truck.

## Kelly-Springfield Adds to Line

Two Worm-Driven Models Bring Product Up to Eight—One is 1½-Ton; Other 2-Ton

WITH the addition of two new worm driven models, the Kelly-Springfield Motor Truck Co., Springfield, O., brings its line up to eight, among which are two 1½-ton models, both chain and worm driven; two 2½-ton models, chain and worm driven, and one each of 3½-, 4-, 5-, 6-ton. Kelly-Springfield trucks have left drive, center control, flexibility of frame and adaptability of chassis, through which secondary drive power is taken off for the operation of special equipment. Noticeable accessibility is found in all models.

A variety of wheel bases is offered in the 1½- and 2-ton models, these ranging from 110 to 180 inches, with the loading spaces back of the driver's seat varying from 8 to 15 feet. With the four heavier models, wheelbases ranging from 120 to 208 inches are offered, the loading spaces back of the driver's seat in these types being from 10 to 17 feet.

### 1½ and 2½ Ton

The two new worm driven models are known as the K-32 1½-ton and the K-36 2½-ton. The worm and gear in these models are designed and built by the Timken David Brown Co. Driving strains are taken through radius rods swivel jointed at each end, while the torque and braking reaction is taken through the springs. These features provide a flexible drive which relieves the frame of sudden shocks due to starting or the sudden application of the brakes.

The motors used in both of these models are four-cylinder, block-cast with a bore of 3¾ inches and a stroke of 5¼. Both inlet and exhaust valves are of the poppet design inclosed in a dirt and dust-proof compartment. Oiling is accomplished by a spiral gear driven pump located in the lower compartment of the crankcase. A



View of one of the new additions to the Kelly-Springfield line

Rayfield carburetor is used in both models, the carburetor having both hot water packet and hot air tube connections in the lower end of the exhaust pipe. An Eisemann magneto furnishes the ignition.

Centrifugal pump cooling is found in these two models, the pump being located in the forward end of the motor and driven by spiral gears off the camshaft. The radiator is of the honey comb type and is placed immediately in front of the dash and mounted on a flexible spring support.

The engine transmits its power from the cone clutch to the main drive shaft, thence through the gearset, which is of the selective type offering three speeds forward and one reverse, and finally through a propeller shaft to the worm in the rear axle. The gearset is built as a unit with the jack shaft housing and located amidship of the chassis. The steering gear is of the worm and gear type and is provided with outside adjustment for taking up all wear.

Both brakes are internal expanding, the shoes being lined with autobestine and acting on 17½ inch drums. Both front and rear springs are semi-elliptic, the frame and load being supported by two of each, which rest on seats forged integrally with the axles.

Tires on the 1½-ton are 36 by 3½ solid in front and 36 by 5 solid in the rear, while on the 2½ model they are 36 by 4 single solid in front and dual solid in the rear. On the lighter truck the tread in front is 66 inches, with an option of 60 inches, and the rear standard 60 inches. The tread of the 2½-ton is 60 inches in front and 65 inches in the rear.

### A QUARTER-MILLION TRAINLOAD

Winnipeg, Can., March 4—A marked check for a quarter of a million dollars was issued this day by the Breen Motor Co. in payment of shipment of 300 Chevrolet cars shipped in one trainload from the Canadian factory at Oshawa and form-

ing part of a total allotment of 1,000 cars contracted for by the Breen Motor Co. for 1916. Two hundred of these cars have been shipped previously and delivered and the balance of 500 will come forward from the factory as fast as shipment can be made. The Breen Motor Co., distributors for the Chevrolet in Manitoba and Saskatchewan, has sold its entire allotment and is endeavoring to secure a further allotment from the factory to meet the demand for this car from their agents.

During the past week Breen company has shipped fifteen carloads of Studebakers to country points and has twenty more carloads on the road now from the factory for distribution.

### TO FORM DEALERS ASSOCIATION

New Orleans, La., March 4—State-wide organization is proposed as a possibility of the motor car show, which will be held in New Orleans March 9. The proposition now is under discussion among aggressive members of the New Orleans Automobile Dealers' Association and it is likely to be brought to fruition soon.

The broadening out of the New Orleans dealers' organization has been suggested by many out-of-town dealers, who have been drawn to New Orleans both by the carnival season and the announcement of the 4-day show with its promise of success.



The Kelly-Springfield worm drive



Spring mounting and brake of the Kelly-Springfield



# Thomas Aero Engine Parallels Motor Car Power Plant Practice

**S**MALL-BORE high-speed engines are going to be the ultimate power plants in aviation work as well as in motor car practice according to the views of the Thomas Aeromoter Co., Inc., Ithaca, N. Y., which has just brought out a new V-motor of this description. According to the claims of the manufacturers it will develop 135 horsepower and yet its dimensions are but 36 inches in length between front and rear gear cover plates and 28 inches maximum width. The crankshaft speed is 2,000 r. p. m. and the propeller shaft operates through spur reduction gears at 1,200 r. p. m.

## Like Conventional Eight

Aeronautical and motor car practice are paralleling each other in simple and accessible grouping of accessories and in this respect the Thomas motor is thoroughly up to date. In general appearance the new engine is not unlike the conventional eight-cylinder 90-degree motor car engine. The cylinders are L-head design, 4-inch bore, 5-inch stroke, with  $1\frac{1}{2}$ -inch valves of tungsten steel. A feature in the cylinder design which stamps the engine as different from motor car practice is the water cooling of the valve caps, access being had to them by the removal of aluminum cover plates.

The valve springs are of large diameter and of fairly heavy section to prevent the floating of the valve at top speeds. Other details of the cylinder design which are worthy of attention are the generous proportions of the cylinder feet and the closeness of the studs to the cylinder valves. The method of holding the pushrod guides in an extension of the cylinder feet also is interesting.

In working out the design of the valves and manifolds particular attention has been given to secure accurate action and

## Small-Bore, High-Speed, V-Type Design Followed Out — Develops 135 Horsepower

high volumetric efficiency. The pushrods are of square section and work in broached aluminum guides. They are acted upon directly by the cams without intermediate rockers or followers and are drilled hollow to secure light weight.

An aluminum intake manifold is used which is fitted to a 2-inch, double-barrel Zenith carburetor. One nozzle and jet takes care of one bank of cylinders and efforts have been made to eliminate bends in the gas passages. The result of this installation is shown in the economy which is claimed to be a consumption of but  $13\frac{1}{2}$  gallons per hour. One water pump is used with a Siamese outlet to the cylinder jackets. The starter is located in the V with its shaft extending through the gear housing and carrying on its outer end the centrifugal water pump motor. Two Dixie magnetos are used running at crankshaft speed with four spark plugs per cylinder.

## The Lubricating System

Oiling is by force feed with the lubricant delivered at 60-pounds pressure. Crank pins, webs and main journals are drilled so as to carry oil to the lower connecting rod bearings which are arranged side by side. The pistons, which are of a special aluminum alloy, are lubricated by oil thrown from the crankpins and in order to maintain the oil temperature within the proper limits there is an oil cooling system with a circulating gear pump entirely independent of the lubricating system. The oil in the sump is taken by this separate

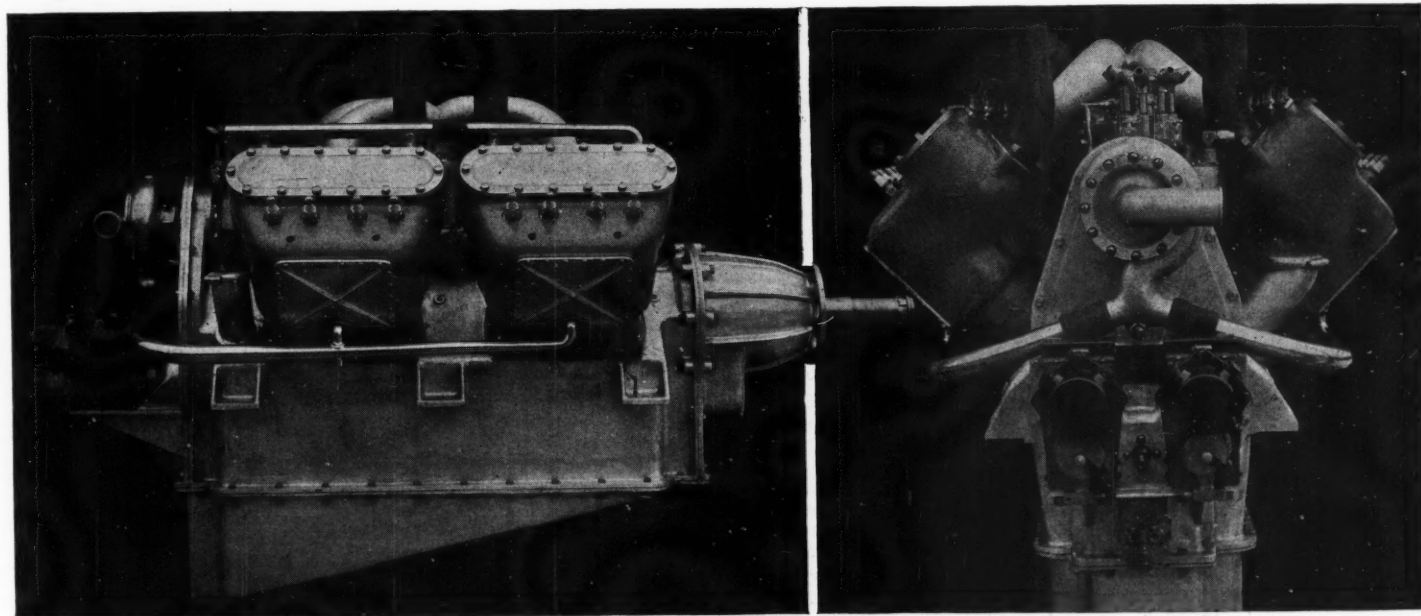
gear pump and passed through cooling coils exposed to the air stream from the propeller and this again delivered to the sump.

As would be expected in aeronautical use light-weight reciprocating parts are a necessity. The connecting rods are of eight section made of chrome nickel steel machined on all sides. They are  $11\frac{3}{4}$  inches between centers and the webs and flanges are but  $\frac{5}{64}$ -inch in thickness. A complete assembly of piston, piston pin, connecting rod and connecting rod cap weighs but  $3\frac{3}{4}$  pounds. The babbitt is applied directly to the steel at the lower end of the connecting rod. The crankshaft is supported on three bearings running in a novel type of perforated steel-back babbitt bearing.

## TO BOOST SPEED IN CAPITOL

Washington, D. C., March 4—Declaring that the 10-year-old traffic laws of the District of Columbia should expire on account of age, Congressman Thomas W. Miller, of Delaware, has introduced a bill in the house to increase the speed limit within the fire limits from 12 to 18 miles an hour. Outside the fire limits the speed is to be increased from 20 to 25 miles an hour.

Congressman Miller, who is a motorist, says that before offering his bill he made a complete tour of all the streets of the city and found that hardly any of the motorists were obeying the law literally. It would be impossible for them to do so, he explained, because nobody wants to travel as slow as 12 miles an hour. Besides, with the thousands of motor vehicles daily upon the streets the result would be a congestion of traffic that would actually handicap business. The bill seems to stand a good chance of becoming a law.



Thomas aero motor, showing layout of this unique powerplant. Note that two magnetos are used

# From the Four Winds

**SCRIPPS-BOOTH WINS IN ICE HANDICAP**—This is not a sail of Scripps-Booths. The car is seen, however, assailing the record of an iceboat on Lake St. Clair, near Detroit, Mich., where Herbert Woodall staged a race recently to make good a boast about his Scripps-Booth. Skidding is a normal occupation with an iceboat, but not to be searched for when in a motor car. In spite of the ice handicap, however, the Scripps gained advantage by being able to move against the wind and made a creditable showing.

**Race at San Diego Fair**—A 50-mile motor race is scheduled for March 25 at the fair grounds in San Diego, Cal. The track will be under the direction of the Panama-California International Exposition. Entries have already been received from half a dozen drivers. The entrants will compete for a \$2,500 cup offered by the exposition and money prizes. The race will be run over a mile track inside the exposition grounds.

**Beavers Dam Rivals Roosevelt**—Another dam across Salt river in Arizona, just below the famous Roosevelt dam, is rivaling that famous achievement of mankind as an attraction for tourists passing over the Apache trail. The new dam is the work of a colony of beavers, which have taken up their residence within a few feet of the Apache trail. One of the trees that they cut down for their dam fell the wrong way and obstructed the roadway. The beaver is rapidly becoming extinct and it is believed that there is no other colony of the interesting animals so near an important highway. Beavers are not protected under the



Arizona law, but the Roosevelt colony has plenty of protectors among the residents of this section.

**Chauffeurs' Association Booms**—The Professional Chauffeurs' Association, Washington, D. C., which was recently established, and which is working to the end that the interests of the members may be furthered, rapidly is increasing its membership. At the last meeting held nine new members were taken in and eleven applications received.

**Washington, D. C., Has New Semaphores**—The Metropolitan Police Department of the District of Columbia has inaugurated when is known as the Washington standard semaphore, which now is in general use in that city. It has a number of exclusive features not incorporated in the semaphore in use by the police department of other large cities. One of these features is a spheroidal lens which differs from and is a considerable improvement upon the old bull's eye type. Another change is in the state of the signal arms. These semaphores are proving very satisfactory.

**Kentuckians Want Standard Horsepower**—Great difficulty is being experienced by the motor vehicles department of Kentucky in getting the motorists of the state to accept a standard horsepower rating for their cars. The N. A. C. C. rating, which considers only the bore of the engine, is accepted by all the states, although other standards are perhaps more accurate, it is pointed out by Deputy Commissioner Ramsey, and to avoid confusion the state has adopted this standard and prepared a table

of rating which was mailed with application blanks to all motorists in the state recently. Many cars are advertised at a greater horsepower than the N. A. C. C. rating, says Mr. Ramsey, and when an affidavit of horsepower is made and license issued there is no provision in the law by which any overpayment can be returned, although the department may well know that the rating is in error.

**Death From Gasoline Burns**—A gasoline explosion caused by the bursting of an electric bulb resulted in the death of Antonio Bray, at Douglas, Ariz. Bray was in a pit under his car, cleaning the crankcase. He had gasoline in an open vessel and held a light bulb in one hand. He accidentally dropped the bulb, which exploded as it struck the floor. The momentary flash was sufficient to ignite the vapor from the gasoline and in a moment Bray's clothing was in flames. He died in a hospital the next day.

**Workhouse for Car Borrowing**—Motor car borrowing in Minneapolis, Minn., has received a check. A decision by a district judge which was made to read by the public that it was no felony to take a car if there was an intention of returning it, seemed to have resulted in a wave of car borrowing. Now the offenders go to the workhouse. Police had been saying that the courts were too easy with offenders who took machines for a ride and that there was little use in arresting them, because they would be paroled. Judge C. L. Smith, of the municipal court, gave straight workhouse sentences of 75 days to two offenders. The judge said:

"Through sentimental and ill-advised administration of the law there is no longer private ownership in motor cars. Theft is committed daily of valuable machines under the plea of 'borrowing.' In this instance machines aggregating more than \$4,000 in value were stolen. This must stop."

**Washington Truck Salesmen**—The following facts about the motor truck business in the state of Washington recently have been compiled: Number of trucks in use, 3,953; trucks in western Washington, 3,404, or 86 per cent; in King county, 1,701, or 46 per cent of total in state. Value of all trucks in state, \$8,262,400. Value of trucks in western Washington, \$7,113,800. Value of trucks in King county, \$3,554,600. Territory served from Seattle, twenty-four counties west of Columbia river. Different lines of business in which trucks are operated in Seattle, eighty-eight.

**New York's Oldest Resident Drives Car**—When a person reaches the ripe old age of 96, the greatest part of which has been spent as a judge of good horse flesh, and when that person comes to selecting a motor car, it truthfully can be said that he brings wisdom seasoned by years to help in his choice. For three-quarters of a century Henry Spicer, Dexter, N. Y., rode behind the fastest horses he could buy or raise. Now Mr. Spicer owns a Jeffery touring car and recently had the honor of being the oldest citizen of the State of New York to take out a license. This is Mr. Spicer's second year as a motorist, with 5,000 miles to his credit last season.



## Good Roads Activities

**Colorado Highway Officials Elected**—At a special meeting of the Colorado Highway Association, Ralph W. Smith, vice-president of the Denver Motor Club and also Rocky Mountain vice-president of the American Automobile Association, was chosen president to succeed Charles L. Newcomb, Jr., who recently resigned to locate in Delaware. Charles F. Roehrig, secretary-treasurer of the Denver Motor Club, was also made a director from the city and county of Denver.

**To Buy Pennsylvania Toll Road**—Action has been taken by the Pennsylvania highway commissioner for freeing from toll that part of the Lancaster pike running from the city line of Philadelphia at Overbrook to Paoli. Mr. Cunningham has asked the Lancaster Improvement Co., with headquarters in Philadelphia, to place a price on its holdings so that the state might be in a position to purchase the road and throw it open to travel. The Lancaster Pike, known to the state highway department as Sprout highway route No. 120, is controlled by the Lancaster Improvement Co.

**Julesburg-Big Springs Road Plans**—Progress is being made in raising funds for further improvements on the Julesburg-Big Springs stretch of this 250-mile link connecting the main line of the Lincoln Highway with Denver by way of Julesburg, Sterling, Fort Morgan and Greeley. This link affords tourists an enjoyable scenic trip through the Denver municipal system of mountain parks, from where they can loop back to the main line over a choice of two or three circle trips.

**Kentucky Road Fund Elastic?**—The question whether the Kentucky Department of public roads is limited to the \$25,000 appropriation carried in the 1912 act creating the department, or whether it is limited in expenditures only by the amount of the motor car license fund, is up to the state auditor and treasurer, as the department's expenditures go some \$80 beyond the \$25,000 appropriation for the present fiscal year, running until July 1. Attorney General Logan is of the opinion that the department is limited only by the amount of the motor car fund. His interpretation of the act is that the department as then created, with limited duties and before the 5-cent road tax was voted, was limited to the \$25,000 annually, but that the general assembly had in mind the growth of departmental activities. He said it is probable that if the assembly con-

sidered it necessary to spend \$25,000 annually at the beginning, when the duties of the department were limited, as compared with what they are now, it must have reasoned that expansion of its duties would require an expansion of the payroll expenses.

**Kentucky Dixie Near Completion**—A little more than 43 miles of road, out of a total of 203, remains to be worked out on the Louisville & Nashville division of the Dixie highway, that is in the ten counties in Kentucky between Louisville and Nashville. Ninety-five thousand dollars is available for the work, according to a report compiled from estimates in the offices of the county judges in this district by W. A. Brownfield, Elizabethtown, Ky.

## Coming Motor Events

### SHOWS

March 8-11—Davenport-Rock Island-Moline show.  
March 8-11—Mason City, Ia., show.  
March 9-11—Kenosha, Wis., show.  
March 15-18—Trenton, N. J., show.  
March 20-25—Twin Falls, Idaho, show.  
March 21-25—Deadwood, S. D., show.  
March 22-25—Saginaw, Mich., show.  
March 28-31—Saginaw, Mich., show.  
April 1-8—Butte, Mont., show.  
April 10-15—Seattle, Wash., show.

### CONTESTS

May 6—Sioux City, Ia., speedway race.  
May 13—New York, Sheepshead Bay speedway race.  
May 20—Chicago speedway amateurs' race.  
\*May 30—Indianapolis speedway race.  
June 10—Chicago speedway race.  
June 28—Des Moines, Ia., speedway race.  
July 4—Minneapolis speedway race.  
July 4—Sioux City speedway race.  
July 4—Track meet, Couer d'Alene, Ida.  
July 15—Omaha, Neb., speedway race.  
August 3-5—Hillclimb, Pike's Peak, Colo.  
August 5—Tacoma speedway race.  
August 18-19—Elgin road race.  
September 4—Indianapolis speedway race.  
September 9—Des Moines, Ia., speedway race.  
September 15—Indianapolis speedway race.  
September 29—Track meet, Trenton, N. J.  
September 30—New York, Sheepshead Bay speedway race.  
October 7—Omaha speedway race.  
October 14—Chicago speedway race.  
October 19—Indianapolis speedway race.

\* Sanctioned by A. A. A.

## With the Motor Clubs

**Portland Club Plans Reserve Corps**—At a meeting of the directors of the Portland Automobile Club, Portland, O., President Overmire appointed the following committee to work out a plan of organization for the proposed motor reserve corps: C. C. Overmire, W. M. Cook and James D. Abbott.

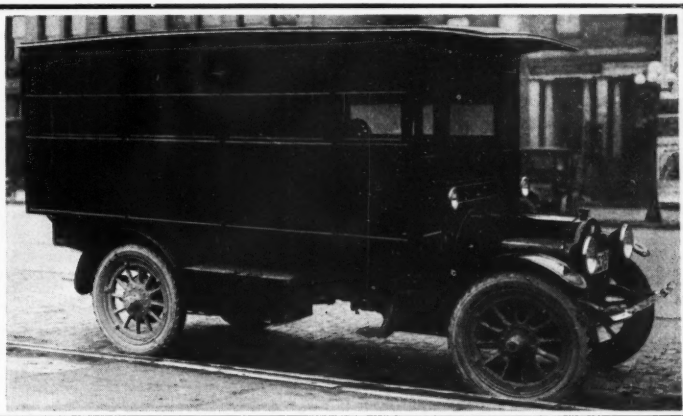
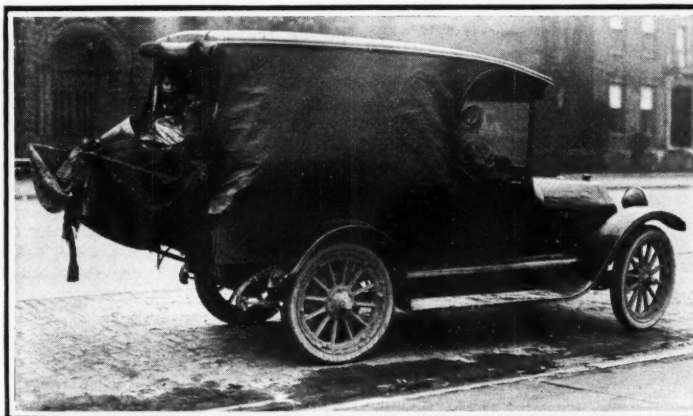
**Dallas Club Gets New Members**—As a result of a campaign for new members 200 car owners have joined the Dallas Automobile Club, Dallas, Tex. This club is one of the strongest in the South. It maintains headquarters downtown and owns a large lake and grounds.

**Massachusetts Has New Club**—The Berkshire County Automobile Association was organized last week at Pittsfield, Mass. George Dutton was chosen president and Harry Cooper, secretary. It is affiliated with the Massachusetts State A. A. The club will elect a board of directors later.

**Beverly Club Plans Activities**—The North Shore Automobile Club, which was formed a short time ago, has leased rooms on Gabot street, Beverly, Mass. It has planned to take up much work for the benefit of motorists during the summer.

**Denver Club Plans Magazine**—The Denver Motor Club, Denver, Colo., has completed arrangements to furnish its members an official club magazine, to be issued monthly, under the name of "Motoroads." The new journal is edited and published by Charles F. Roehrig, secretary-treasurer of the club and formerly publisher of a travel magazine called Trails & Towns.

**Club Parent to Gas Quiz**—The war on the high price of gasoline which was started by the Springfield (Mass.) Automobile Club has reached Boston and it now is up for legislative action there. Representative Thomas J. Giblin at the request of the Bay State A. A. introduced a resolution in the legislature which calls upon the Interstate Commerce Commission to inquire whether or not there is discrimination being practiced against Massachusetts in the price of gasoline. The Committee on Rules allowed it to pass and the resolution will now go before the committee on federal relations. If it gets a favorable report it will then go along to the legislature for action. It will probably pass and then be sent down to Washington. Other clubs have been asked to co-operate in the movement and the organizations in other New England States will be apprised of the work that they may get busy along the same lines.

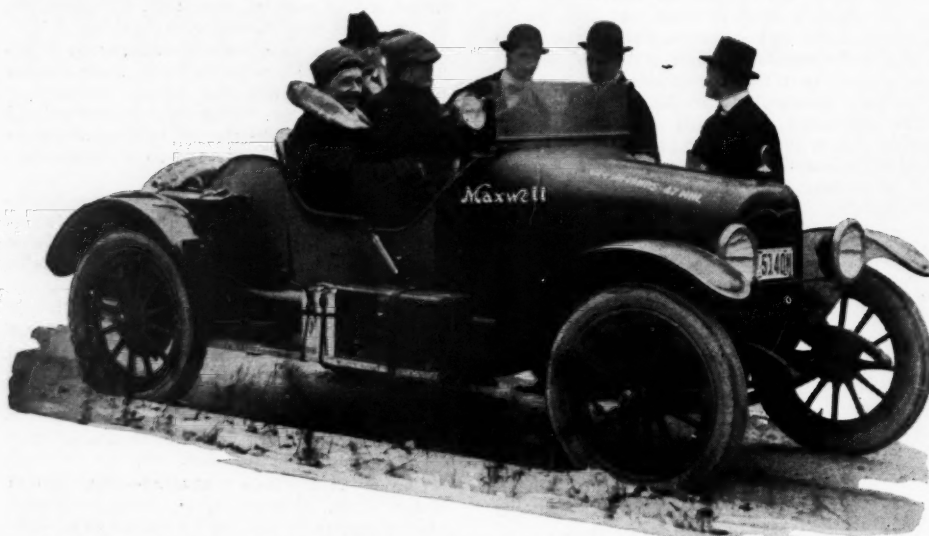


**NOMADS MODERNIZE THEIR EQUIPAGES**—Destroying the tradition that bands of gypsies live by trading horses, a band of forty of the nomads arrived in Columbus, O., recently and stopped for several hours in the downtown section. They were packed in three cars, fitted up with gaily decorated tops, similar in many respects to the tops of the horse-drawn wagons, which formerly housed the various bands of gypsies. One of the cars was a Buick, fitted up with a bright red top similar to a sandwich wagon. It was claimed to cost \$3,000. Another was a Reo costing \$1,000 and the third a

Studebaker, priced at \$750. All of the cars were purchased and fitted up in Indianapolis last week. John Floris was the leader of the band, among which was a 75-year-old woman, the sage of the crowd. The youngest of the large crowd of children was 3 months old. In all, three families, all related, inhabited the three cars. The largest of the families had eleven children. The band claimed to be from Argentine, to which country they claimed allegiance. Floris, when asked concerning the innovation, said, "Like machines much betta. No have to feed 'em."



# Among the Makers and Dealers



**KING OF THE MOUNTAIN ROAD**—The above illustration shows Ray McNamara and the Maxwell car in which he drove across the Alleghenies, from Philadelphia to Pittsburgh, in 8 hours, 19 minutes, breaking all records for the famous 294-miles testing course on February 11.

**SEHL Goes to Studebaker**—J. P. Sehl, formerly commercial body designer of the Pierce-Arrow Motor Car Co., Buffalo, N. Y., has joined the body designing department of the Studebaker Corporation in Detroit.

**American Motor Site Sold**—The American Motor Realty Co., Indianapolis, Ind., owner of the site and plant formerly occupied by the American Motors Co., at South Meridian street and the right-of-way of the Indianapolis Union Railway Co., has sold the property for \$70,000 to the Indianapolis Cordage and Implement Co.

**Latchstring Out to Dominion Garagemen**—At a meeting of the board of directors of the National Automobile Trade Association, February 26, which was held at the headquarters, 208 South La Salle street, Chicago, it was voted to allow the garagemen and dealers of the Dominion of Canada to become members. This action was taken as a result of many inquiries from Montreal, Toronto, St. John and Hamilton.

**New Brass Foundry**—Louis D. Fisher, Milwaukee, Wis., has established a brass foundry and will specialize in die-castings. The formal opening was held February 25, when Mr. Fisher acted as host to a large party of Milwaukee manufacturers. The first heat was poured by Mr. Fisher, and was run into medallions commemorating the event. The business is being conducted under the style of Fisher Brass Foundry Co.

**Farrington Goes to Gibson**—Richard Farrington has been appointed assistant to H. R. Williams, manager of sales of the Gibson Co., Indianapolis, Ind., and will have charge of advertising. Farrington comes to his new position well equipped, as in addition to having been editor of the motor car department of the Indianapolis Star for some time, he was previously connected with an advertising agency, and also with newspapers in other cities.

**U. S. Tire Salesmen in Convention**—A meeting of the salesmen of the Cleveland and Columbus, O., branches of the United States Tire Co. was held at the offices in Cleveland last week. It was in charge of District Manager P. H. Goodall, who talked of the successful business of last year and

the opportunities before the men the coming season. F. I. Reynolds, manager of the pneumatic tire department; R. R. Drake, manager of the service department, and R.

## The Show Circuit



**Kankakee, Ill., Show**—Dealers in Kankakee, Ill., will hold a motor car and style show in that city March 15, 16 and 17. There will be a special window display by each merchant and all dealers in cars will arrange a joint display at the same time.

**Bangor, Me., Show**—The Bangor, Me., dealers have planned to hold a motor show at the Morse Winter Garden during the week of April 24-29. There are many lines represented in Bangor and with the accessory lists available it will make a good-sized exhibition.

**Portland, Me., Show**—The biggest motor show ever held by the Portland Automobile Dealers' Association, Portland, Me., closed last week. It was a big success and all the dealers are happy as a result of the sales. There were many dealers present from Boston and the exhibits were on a larger scale than ever.

**Springfield, Ill., Show**—De Witt McConnell has been appointed general manager of the first annual show in Springfield, Ill. The state arsenal has been secured for the display and it will be under the auspices of all of the dealers of that city. The arsenal is one of the largest public buildings in the state and is ideally adapted for such a purpose. The dates will be March 14 to 17. The decorations will be under the direction of George Hodgkinson and will be on an elaborate plan. One factory will exhibit a small model of its plant, while another will assemble a car in full view of the audience. Many other novel features are planned.

V. Dickinson, special representative, were present and all talked on subjects of interest in this field.

**Ross Goes to Dodge**—Frank Ross, for the last 5 years superintendent of the Cleveland Foundry Co., Cleveland, O., has become superintendent of the compressed steel division of the Dodge Bros. factory at Detroit, Mich.

**Maxwell Representative in Orient**—The Maxwell Motor Co., Detroit, Mich., has decided to get first-hand information about the motor car business in the Orient and how it further may be developed. To that end Walter T. Langwell, of the sales department, will sail for Japan and China April 22.

**Cleveland Company Adds**—The Parish & Bingham Co., Cleveland, O., has secured a permit to erect a fireproof addition to its factory building. The building will be 900 feet long and 100 feet wide, with a height varying from 20 to 30 feet. At the same time it asked permission to build an addition to its boiler room. The two will cost about \$130,000. Several other buildings have been planned by the company.

**Grant-Lees Business Increases**—The output of the Grant-Lees Gear Co., Cleveland, O., has increased over 400 per cent in the last three years. The capacity of the factory is now 120 complete transmissions per day and the company is furnishing transmissions for some of the best cars in the country. Three years ago the company did largely a jobbing business in gears, but after a study of conditions in the industry experts in gear work were secured and the business extended.

**Winton Changes Color Scheme**—The Winton Co., Cleveland, O., has reversed the usual procedure, where both light and dark colors are used on closed car bodies and now is putting the light shades above the seat line and the dark shades below. This plan of coloring is believed to make the cars look more cheerful, since the human vision has a tendency to take in the upper half of everything before the lower portion is noted. While this fact might not be recognized by most people at first, a little observation will demonstrate its truth.

**Sell Twenty-six Cars in 2 Months**—Charles Williams has proved himself to be the star salesman of the Waterhouse Sands Co., distributors of Studebaker machine in Seattle, Wash., and King county. Over a period from December 15 to February 15 he disposed of twenty-eight cars and won the prize offered by his firm—a trip to the Studebaker factory. Joseph Jefferson was his nearest competitor for the coveted prize, with a total of twenty-seven sales to his credit. The seventy-six cars were sold at retail in the poorest season of the year, with weather conditions worse than they ever have been.

**Norwegian Dealer Visits America**—The Hupmobile distributor in Norway, Victor E. Lindzen, of Lindzen & Robsahm, Christiania, is visiting the Hup Motor Car Co., Detroit, Mich., to make arrangements for securing a larger number of cars for sale in Norway. According to the visitor, the outlook is very bright for a big business, as conditions in general are better today in Norway than they have been in many years. If cars are to be sold, they will be principally of American make. Before the war the majority of cars sold were of German origin, also a few from France, Belgium,



Great Britain. From Germany no cars at all can be secured, while the products from the plants in the other countries almost all are used in those countries. The number of cars in operation in Norway now is estimated to be 2,000.

**Barrett with Washington Paige**—C. L. Barrett has become connected with the Paige Motor Car Co., and will be in charge of a technical and service station which this company has established.

**Chescheir with Milburn**—George M. Chescheir, formerly with the Pollock Corp., Washington, D. C., has become connected with the Milburn Wagon Co., and has been assigned as manager of the Minnesota territory.

**Painter Hupp District Manager**—John C. Painter, who has been in charge of the technical service department of the Hupp Motor Car Co., Detroit, Mich., has been promoted district manager for the territory including Michigan, Ohio, northern Indiana and part of West Virginia.

**Batavia Rubber President to Retire**—A. W. Caney, president and active manager of the Batavia Rubber Co., Batavia, N. Y., and one of the original incorporators, has sold the greater portion of his stock and has retired from an active position with the company.

**Walker Canadian Hupp Manager**—W. J. Walker, Canadian sales representative, has been appointed district manager of the Hupp Motor Car Co., for western Canada, which includes Alberta, Manitoba, Saskatchewan and western Ontario in the territory. He will have his headquarters in Winnipeg.

**First Up Mt. Hood**—C. M. Menzies, manager of the Northwest Auto Co., Portland, Ore., enjoys the distinction of being the first to drive a machine this year beyond the toll gate on Mount Hood. The trip was made in a Reo from Portland in 2½ hours, which was exceptional in view of the roads encountered.

**Langmaid Goes to Needham**—Chase Langmaid, Boston, Mass., manager of the New England branch of the Federal Tire Co., for some years, has resigned to become sales manager of the Needham Tire Co. He is succeeded by William H. Piggott, who was sent on from the factory at Milwaukee. H. L. Diechert has been sent on also as New England traveling representative.

**Trio Go to Vim**—T. E. Cathcart, W. L. Kroneberger and Howard Hewitt have joined the Vim Motor Truck Co. Mr. Cathcart formerly was with the Standard Roller Bearing Co., in charge of sales for Rudge-Whitworth wheels. Mr. Kroneberger was with the Curtis Publishing Co., in the circulation department, and Mr. Hewitt was factory service manager of the Morgan Dean Rapley Co., Hamilton, Ont.

**Rands Company Adds**—The Rands Mfg. Co., Detroit, Mich., has just completed a large addition to its main plant, for the construction of windshields. This organization has had a meteoric career. Starting in a small way a few years ago it now ranks high among the financial and industrial organizations of its kind. The immense business done by the company has necessitated a 25 per cent increase in floor space within the last 6 months.

**Timken Adds at Canton**—The Timken Roller Bearing Co., Canton, O., announces that a new addition, which will give employment to 200 men, will be built. This announcement was made following action by the city council granting the company permission to use a portion of Nineteenth street. When it was reported that the new addition would be erected at Detroit, where another branch of the company is located, the city council granted the permission desired.

**Pathfinder Running Day and Night**—The Pathfinder Co., Indianapolis, Ind., has been forced to keep its factory in full operation day and night.

## Recent Incorporations

**Albany, N. Y.**—Monarch Tire Co.; to manufacture tires, tubes, accessories, motors, etc.; capital stock, \$1,000; incorporators, Fred Rothschild, William Rothschild, J. Siskind.

**Albany, N. Y.**—American Motors Co.; capital stock, \$25,000; incorporators, C. B. Arndt, C. A. Dove, A. Frankel.

**Albany, N. Y.**—Fisher Supply Co.; supplies, accessories, equipment; capital stock, \$25,000; incorporators, J. H. Morris, J. H. Jones, A. G. Parsons.

**Albany, N. Y.**—Armor Tread Co.; capital stock, \$35,000; incorporators, John A. Thomas, J. W. Holler, O. S. Humphrey.

**Albany, N. Y.**—Warwick Auto Co.; capital stock, \$8,000; incorporators, I. D. Vance, T. Lawrence, J. C. Lawrence.

**Albany, N. Y.**—Motor Car parts Co.; to manufacture all kinds of motor car parts; capital stock, \$10,000; incorporators, G. S. Clappitt, E. G. Seimser, L. M. O'Brien.

**Ashtabula, O.**—Economy Auto Supply Co.; capital stock, \$2,500; incorporators, L. R. Klumph, M. C. Amidon, J. M. Klumph, M. E. Buckley, L. B. Lockwood.

**Boston, Mass.**—Boston Longford Auto Parts Co.; capital stock, \$100,000; incorporators, J. N. Clark, R. H. Montgomery, C. G. Clark, J. J. Shay.

**Canton, O.**—Canton Auto Sales Co.; capital stock, \$10,000; incorporator, Glen W. Hedley.

**Carey, O.**—National Traction & Plow Co.; capital stock, \$5,000; incorporators, Alexander Carpenter, R. G. Spencer, C. C. Kiseil, E. C. Edwards and C. G. Spencer.

**Cincinnati, O.**—Monarch Motor Truck Co.; capital stock, \$20,000; incorporators, G. B. Jolly and others.

**Chicago**—Applicator Rubber Co.; to manufacture and sell rubber products; capital stock, \$25,000.

**Chicago**—Dort Motor Sales Co.; capital stock, \$10,000; incorporators, I. R. Lineon, J. M. Avery, Julius Lewis.

**Chicago**—Dearborn Motor Truck Co.; to manufacture and deal in motor cars, trucks and other vehicles; capital stock, \$25,000; incorporators, W. G. Farnsworth, W. E. Kenrick and M. H. Guerin.

**Chicago**—Utility Motor Truck Co.; to manufacture motor trucks and motor car accessories; capital stock, \$7,000; incorporators, D. S. Bobb, J. T. Haviland and A. A. Norbey.

**Dover, Del.**—American Motor Truck Co., to manufacture motors, engines and machines of all kinds; capital stock, \$3,000,000; incorporators, H. H. Waller, T. B. Hoy, G. E. Toloupoulos.

**East Liverpool, O.**—Travelers' Garage & Sales Co.; capital stock, \$10,000; incorporators, W. F. McGinial, A. S. August, Clarence Relby and others.

**East Palestine, O.**—McGraw Tire & Rubber Co.; capital stock, \$100,000.

**East St. Louis, Ill.**—Saunders Motor Power Co.; to manufacture motors and other power machinery and appliances; capital stock, \$10,000; incorporators, Roy Saunders, J. N. Keys and R. B. Logan.

**Evanston, Ill.**—Northwestern Garage; capital stock, \$15,000; incorporators, H. G. Williams, Dora Williams and W. W. Winter.

**Elkhart, Ind.**—Elkhart Motor Supply Co.; to deal in motor supplies; capital, \$50,000; incor-

porators, M. S. Daniels, W. H. Stanley, J. E. Armstrong.

**Indianapolis, Ind.**—Hoosier Truck Co.; capital stock, \$5,000; incorporators, C. M. Powell, R. W. Estep and Ollis Edgington.

**McAlester, Okla.**—Crutcher Motor Co.; capital stock, \$8,000; incorporators, J. C. Ruell, R. L. Crutcher, J. S. Stevens, Dudley B. Buell.

**New York**—Carl W. Bush Co.; capital stock, \$75,000; incorporators, F. S. Smith, Lincoln Holland, Jr., P. W. Stevens.

**New York**—National Automobile Association; to act as an agent for the distribution of motor cars and other motor vehicles; capital stock, \$500,000; incorporators, H. C. Anderson, W. F. Hayes, H. F. Karst.

**New York**—S. C. Oliver & Co.; to manufacture motor cars, accessories, etc.; capital stock, \$2,000; incorporators, W. G. Chittick, J. A. Hanway, H. T. Ducker.

**New York**—Arrow Motor & Machine Co.; capital stock, \$100,000; incorporators, L. Uel-scope, G. H. Timmerman, M. E. Sheritt.

**New York**—Columbus Circle Taxi Co.; to manufacture motor driven vehicles, accessories, etc.; capital stock, \$50,000; incorporators, J. H. Crockett, J. F. Wiggins, George W. Weaner.

**New York**—Hanson Autotype Co.; capital stock, \$75,000; incorporators, R. A. Jenks, H. F. Hanson, J. Mark.

**New York**—Cannon Automobile Co.; to deal in all kinds and makes of motor cars; capital stock, \$25,000.

**New York**—Ben Hur Motor Co.; to manufacture motor cars and all kinds of motor vehicles; capital stock, \$1,000,000.

**Peoria, Ill.**—Cadillac Used Car Department; to repair and reconstruct motor vehicles and engines; capital stock, \$3,000; incorporators, R. O. Travis, H. E. Fulmer and G. E. Fulmer.

**Philadelphia, Pa.**—Bethlehem Motor Truck Corp.; capital stock, \$3,000,000; incorporators, J. F. Curtin, S. R. Howard, H. O. Coughlin.

**Philadelphia, Pa.**—Orange Vulcanizing & Supply Co.; to deal in motor car supplies; capital stock, \$50,000; incorporators, J. J. Davis, Annie Davis, Peter T. Loughlin.

**Richmond, Va.**—Roanoke-Bedford Motor Co.; capital stock, \$15,000; incorporators, J. J. Scott, E. A. Rucker.

**Roslyn, Va.**—Mutual Automobile Supply Association; capital stock, \$10,000; incorporators, C. R. Pritchard, H. Wade Pettit.

**Tacoma, Wash.**—Manley-Thompson Bros. & Davidson; capital stock, \$12,000; incorporators, H. R. Manley, R. B. Thompson, W. T. Thompson, Alpheus Davidson.

**Toledo, O.**—States Motor Car Co.; capital stock, \$500,000; incorporators, C. S. Turner, J. H. Johnson, G. H. Nettelman, U. G. Denman, W. B. Smith.

**Trenton, N. J.**—Lincoln Auto Co.; to deal in motor cars and operate a motor car service station; capital stock, \$10,000; incorporators, Otto R. Woell, Julius Stern, A. C. Sayer.

**Seattle, Wash.**—State Auto Owners' Protective Association.

**Wilmington, Del.**—S. S. E. Co.; capital stock, \$2,000,000; to manufacture motor cars of all kinds; incorporators, J. F. Curtin, S. A. Anderson, S. B. Howard.

**Worcester, Mass.**—Seymour Auto Co.; capital stock, \$10,000; incorporators, Robert Seymour, A. K. Seymour.



**FISHERMAN FINDS CAR USEFUL**—The Badger fisherman has found a new use for his inclosed car—a refuge from the cold while fishing through the ice. The above illustration shows an owner of a Kessel All-Year car enjoying a day of angling in and also on a Wisconsin lake.



# The Accessory Corner



## Paramount Interrupter for Fords

THE Detroit Engineering Products Co., Detroit, Mich., has brought out the first of its new accessories for Ford cars, the Paramount interrupter for ignition. This ignition device does away with the vibrator which is fitted to the Ford.

The regular Ford commutator is first removed from the end of the camshaft and the bracket of the Paramount interrupter is attached to the front end of the crankcase at the end of the camshaft, a vertical shaft in the instrument itself being operated by the camshaft, to which the Ford commutator or timer is attached at the top of the apparatus, as shown in the accompanying illustration, and can be advanced or retarded from the wheel, as at present. The vertical shaft runs at the same speed as the camshaft, which is one-half the speed of the crankshaft.

The Paramount interrupter is wired into the circuit between the coils and magneto, the regular vibrator of the car being rendered inoperative. No battery is required, the current from the Ford fly-wheel magneto being used. The interrupter bracket fastens to the crankcase by bolts which utilize holes already there, and the vertical shaft operates a breaker cam containing thirty-two teeth. The interrupter consists of two breaker arms operated by this circular cam, which is so constructed that it automatically opens and closes the circuit between the magneto and the coil at exactly the proper instant during each revolution of the crankshaft, eliminating the necessity of vibrators.

Within a short time the Detroit Engineering Products Co. will also bring out a new type of snubber and shock absorber for Fords, as well as other accessories, all of which will bear the trade name, Paramount. Among those interested in this new concern are Earle Welborn, assistant to Henry B. Joy, president of the Packard Motor Car Co.; Austin F. Bement, secretary of the Lincoln Highway Association; and C. A. Mattison, for years connected with the Connecticut Coil Co. The latter is sales manager.

## Keyless Motor Car Lock

George Wehner, Savannah, Ga., has secured a patent on a keyless motor car lock, and the invention now is on the market. The invention is attached to the coil box of the car, the lever of the switch being replaced by a friction clutch. This clutch turns freely either way without moving the switch. To unlock the switch certain buttons are pressed on the dial. The clutch will turn the switch to magneto or battery as desired. Before leaving the car simply press the button in the center of the dial, and all electric connec-



Two views of the Paramount interrupter for Fords; one showing device by itself and the other the mounting



Breaker mechanism in the Paramount interrupter

tions with the motor are severed. The invention may be attached to any car, and may be moved in any direction without closing the electric connection between the source of electricity and the motor. Press certain buttons and the current is released and can be sent to the motor through the action of the switch lever from battery to magneto. To lock the car a disc in the center of the dial is turned. The combination on the lock can be changed easily as to number and location of the buttons.

## Willson Resilient Rim

F. R. Willson, Worthington, for many years engineer of the Jeffrey Mfg. Co., has invented a resilient rim for passenger cars and trucks. A company is being formed for the manufacture of the rims

and the factory will be located in Columbus, O., according to the industrial bureau of the chamber of commerce, which has become interested. The invention consists simply of a resilient rim, which can be placed on the center and spoke portion of any wheel and embraces a series of steel coil springs, a number of which are in a radial position and a portion in a circumferential position. Those springs are in units, eight to the rim. The inner and outer rim consists of steel channels. On the outer rim is the solid rubber tire.

## Lamps

In the January 20th issue of Motor Age we did the Equi Light Co., of Paducah, Ky., an injustice by saying that the Equi "is controlled by centrifugal force, being mounted on the fan as a convenient means of generating the necessary force for its operation. Since the speed of the fan varies according to the speed of the engine, the magneto resistance is cut in or out, as required." The above statements are incorrect, but were made because of the fact that the same light company formerly made and advertised a device of this kind, but, failing to give satisfaction, it was several months ago discarded by the Equi Light Co. The company is now marketing a light-controlling device which we will, in justice to them, describe.

The Equi is a reactance coil with a variable air gap in its magnetic circuit. It is actuated entirely by the magneto current, and therefore follows closely the fluctuations in the voltage due to the variations in the engine speed. It is constructed in conformity to the principles that govern the regulation of alternating currents as are supplied by the Ford magneto. The design is such that the air gap is open widest, offering no inductive resistance to the passage of the current, when the engine is running slowly, thus permitting the lights to burn at very near their rated candlepower at low speed. At higher speeds the gap is shortened by a magnetic attraction, in a degree depending on the speed. At extreme high speeds the gap is very nearly closed, the magnetic flow in the iron core of the instrument then being strongest, thereby creating sufficient inductive resistance to prevent the voltage supplied to the lamps exceeding their normal rating. This produces a practically uniform light at all speeds, and avoids the excessive voltage that would burn out the lamps. The Equi is attached to the radiator rod under the hood, very close to the dash. There are no holes to drill. Anyone can attach it in a few minutes with a pair of pliers. For further information concerning the Equi, see page 93 of the January 20th issue of Motor Age.